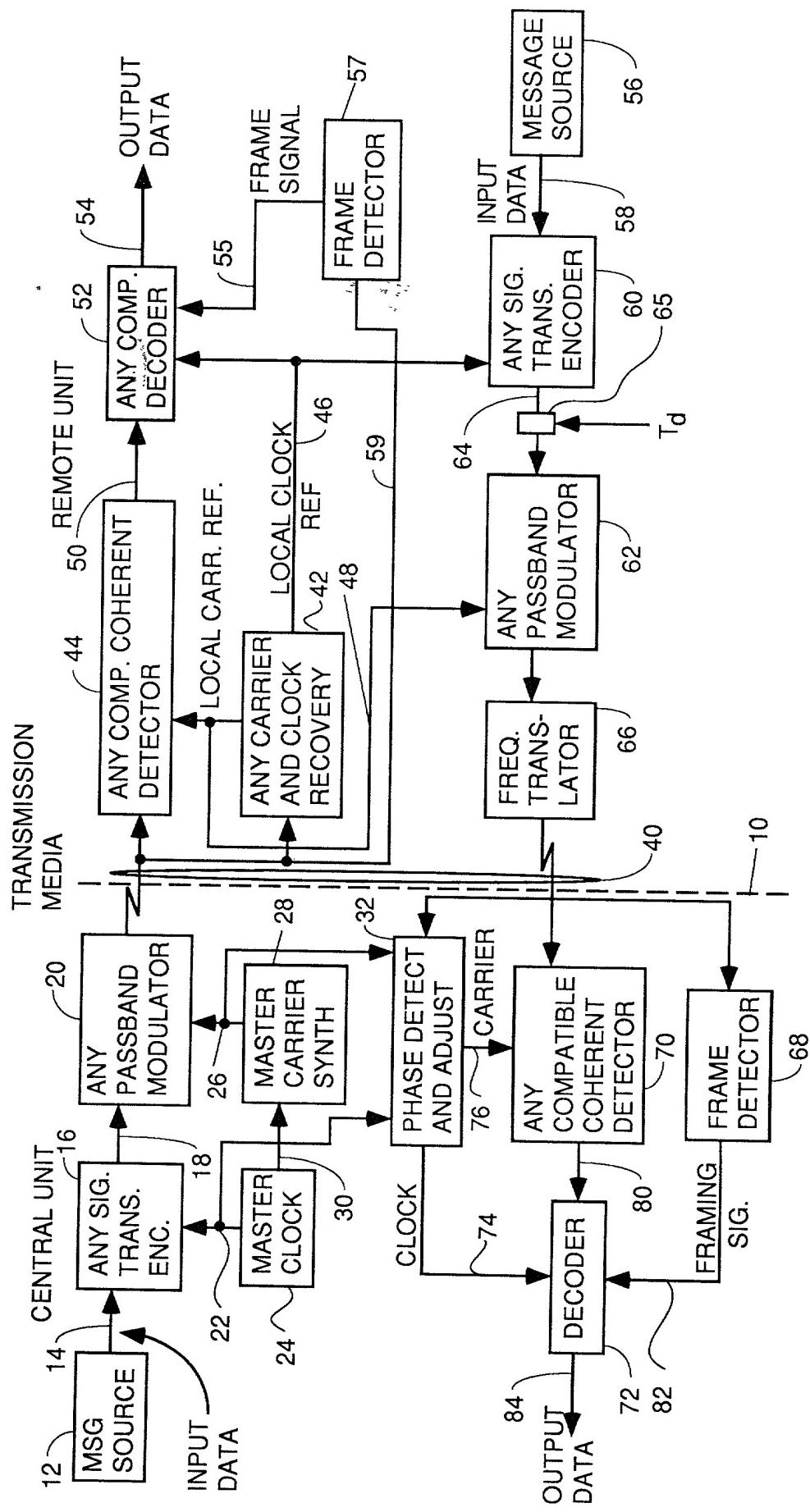


FIG. 1



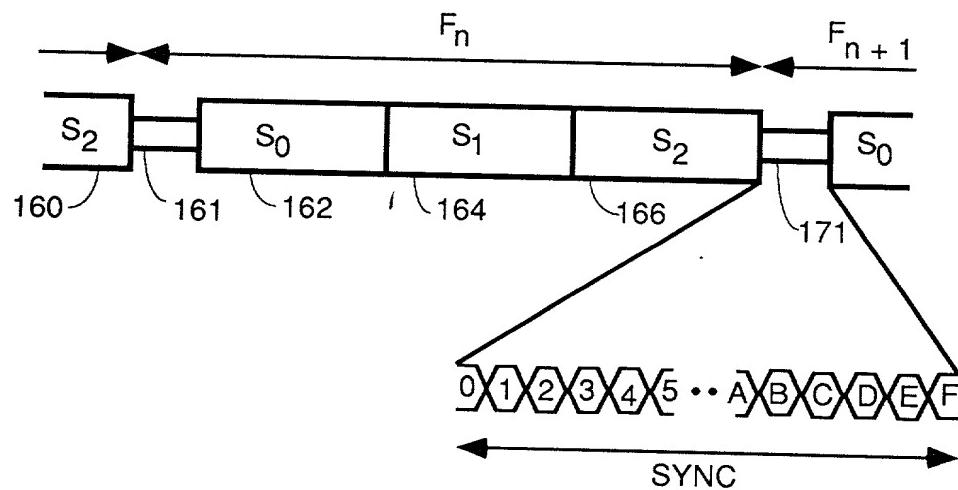


FIG. 2A

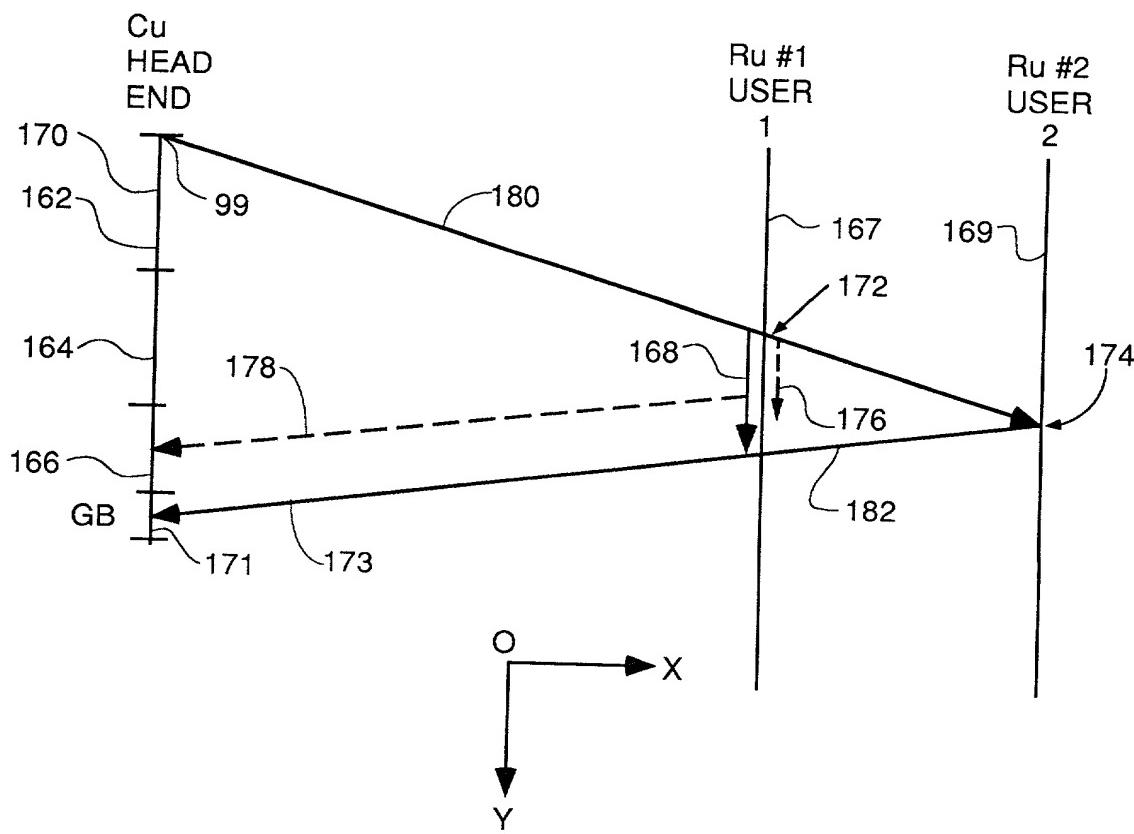
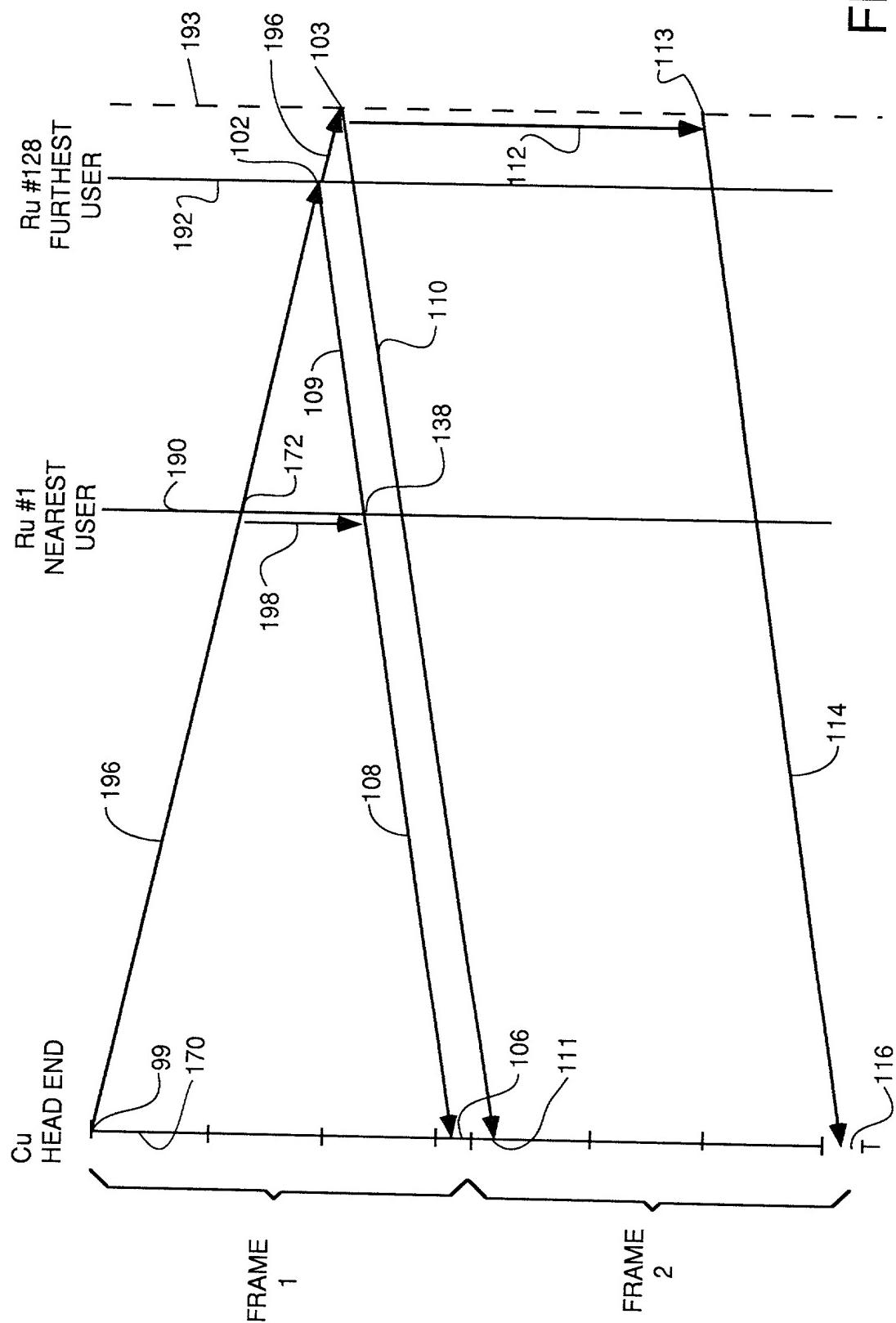


FIG. 2B

FIG. 3



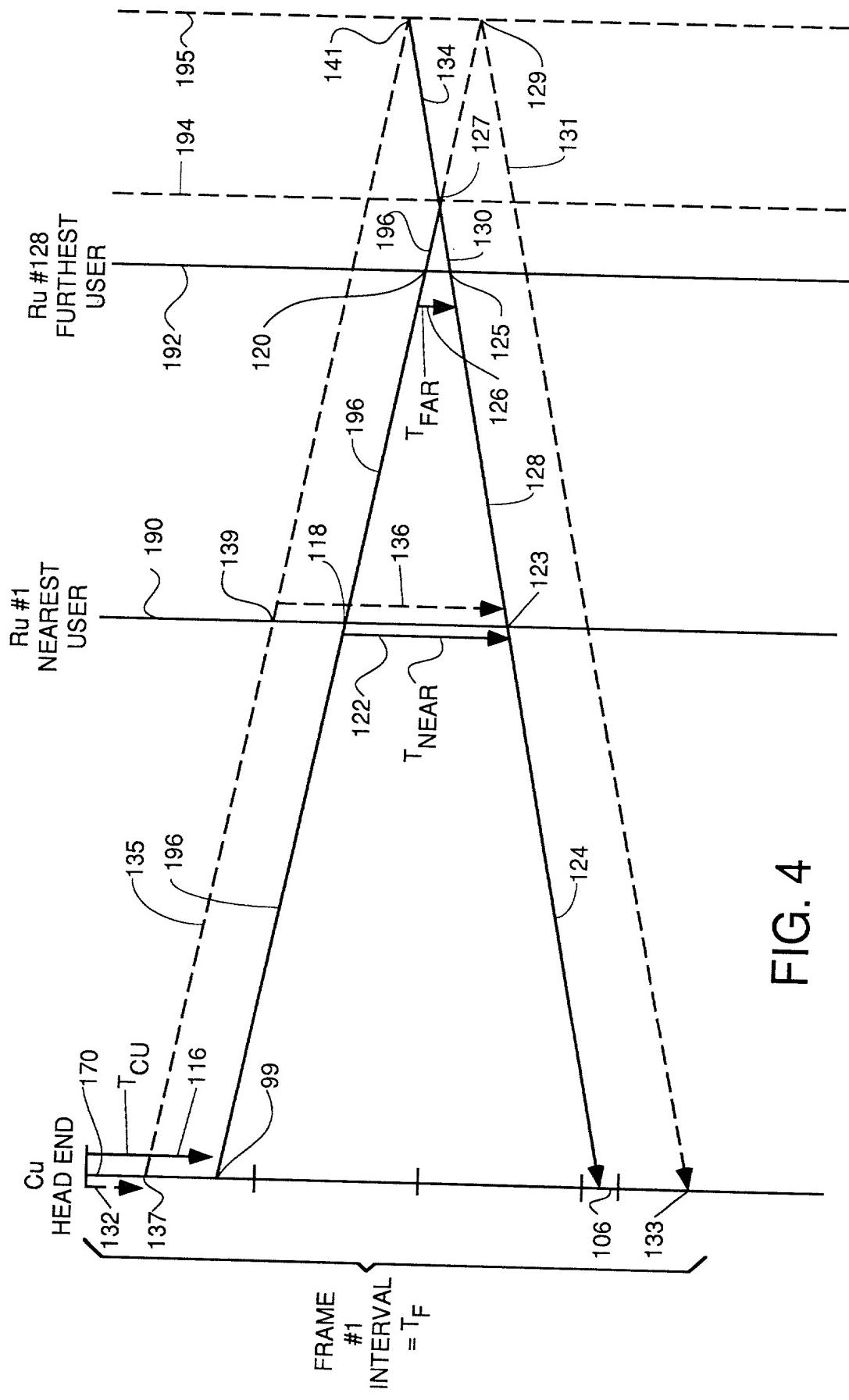
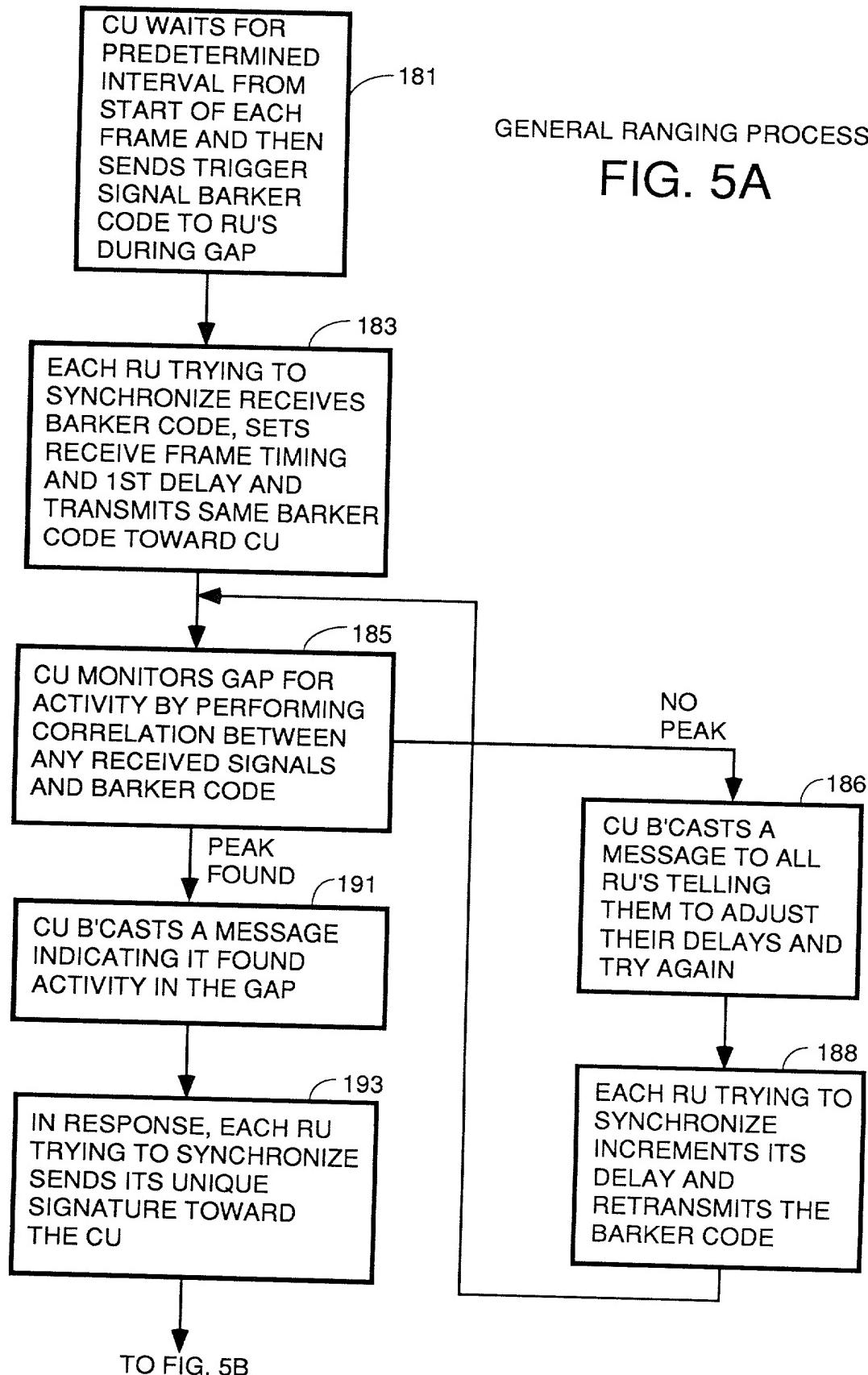


FIG. 4



FROM FIG. 5A

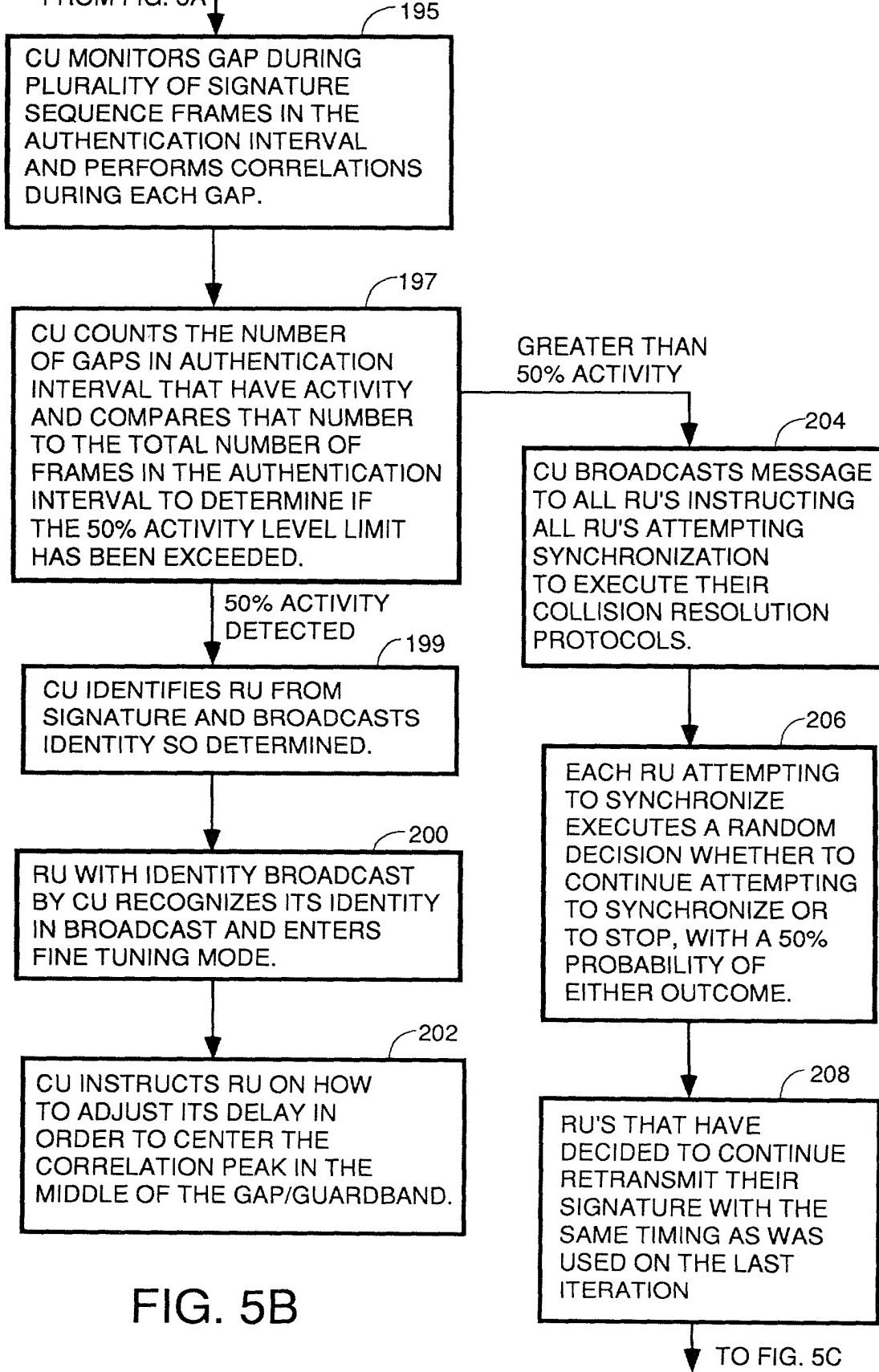


FIG. 5B

TO FIG. 5C

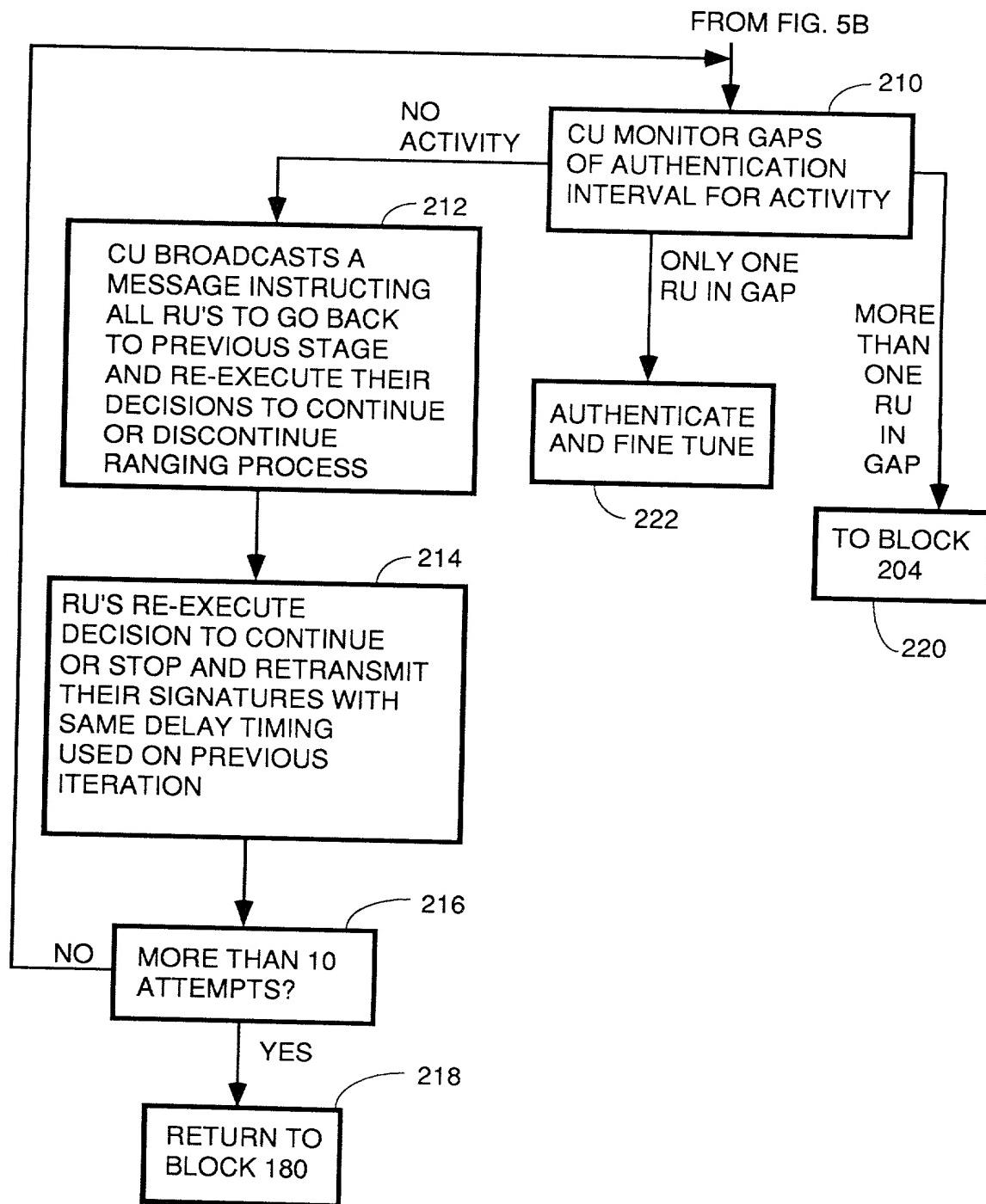


FIG. 5C

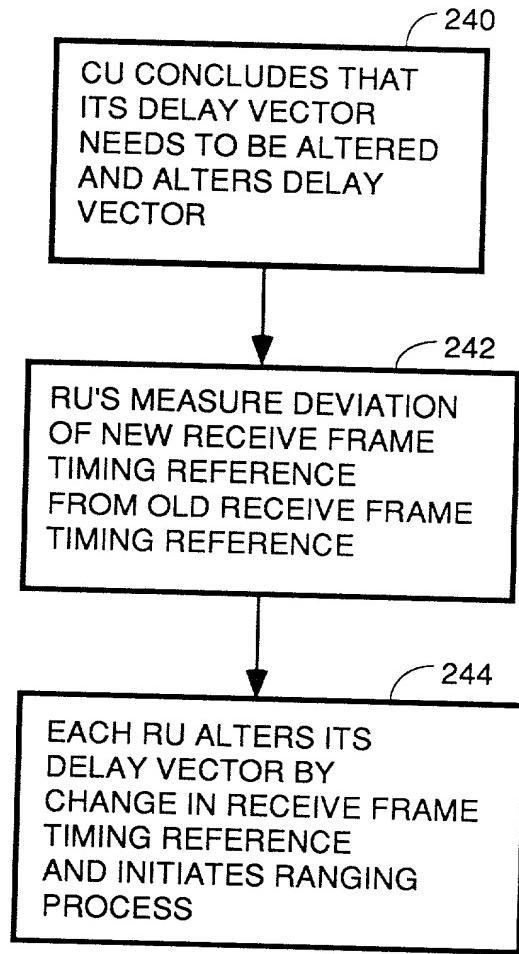


FIG. 6
DEAD RECKONING RE-SYNC

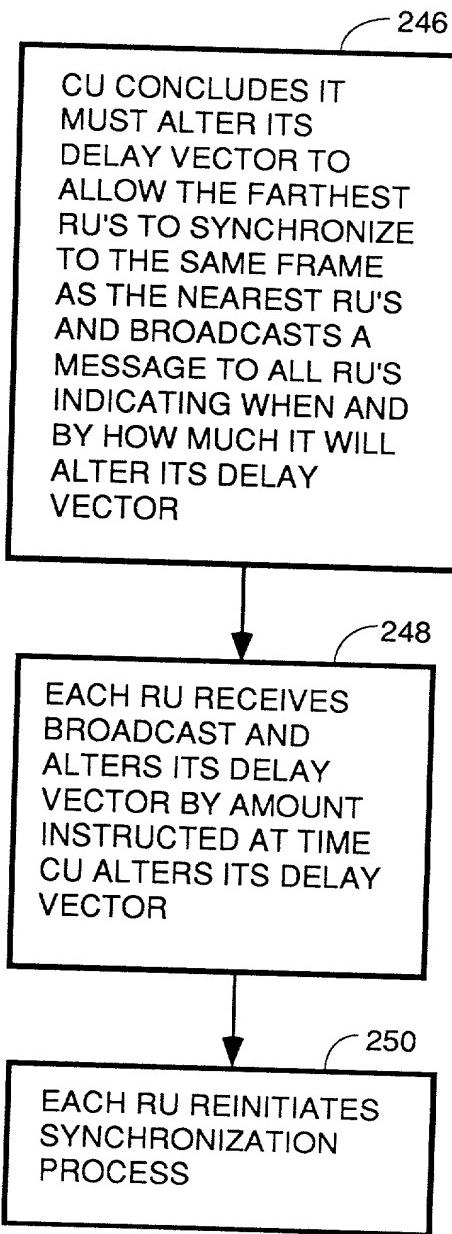
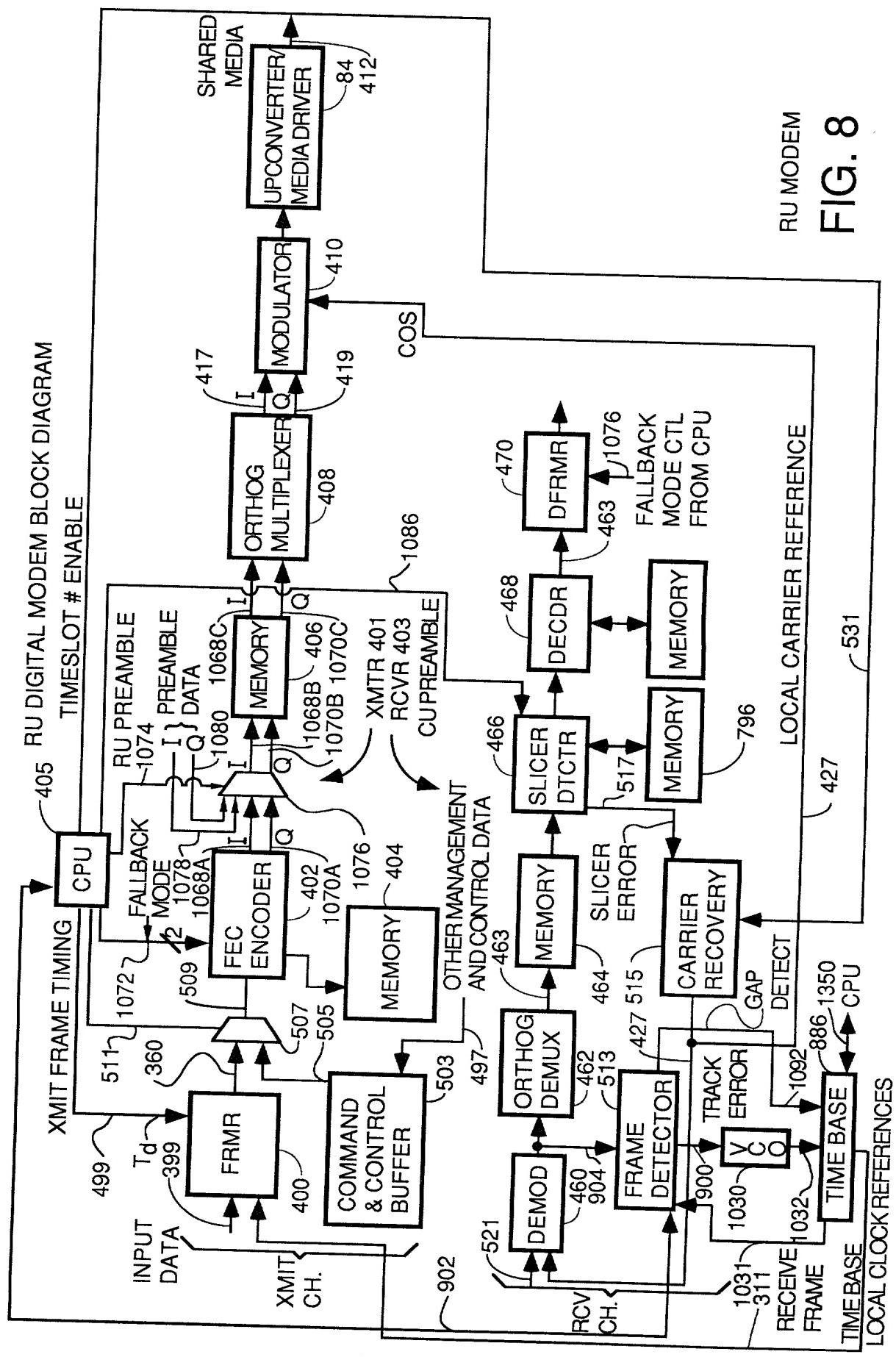


FIG. 7
PRECURSOR EMBODIMENT



8
FIG.

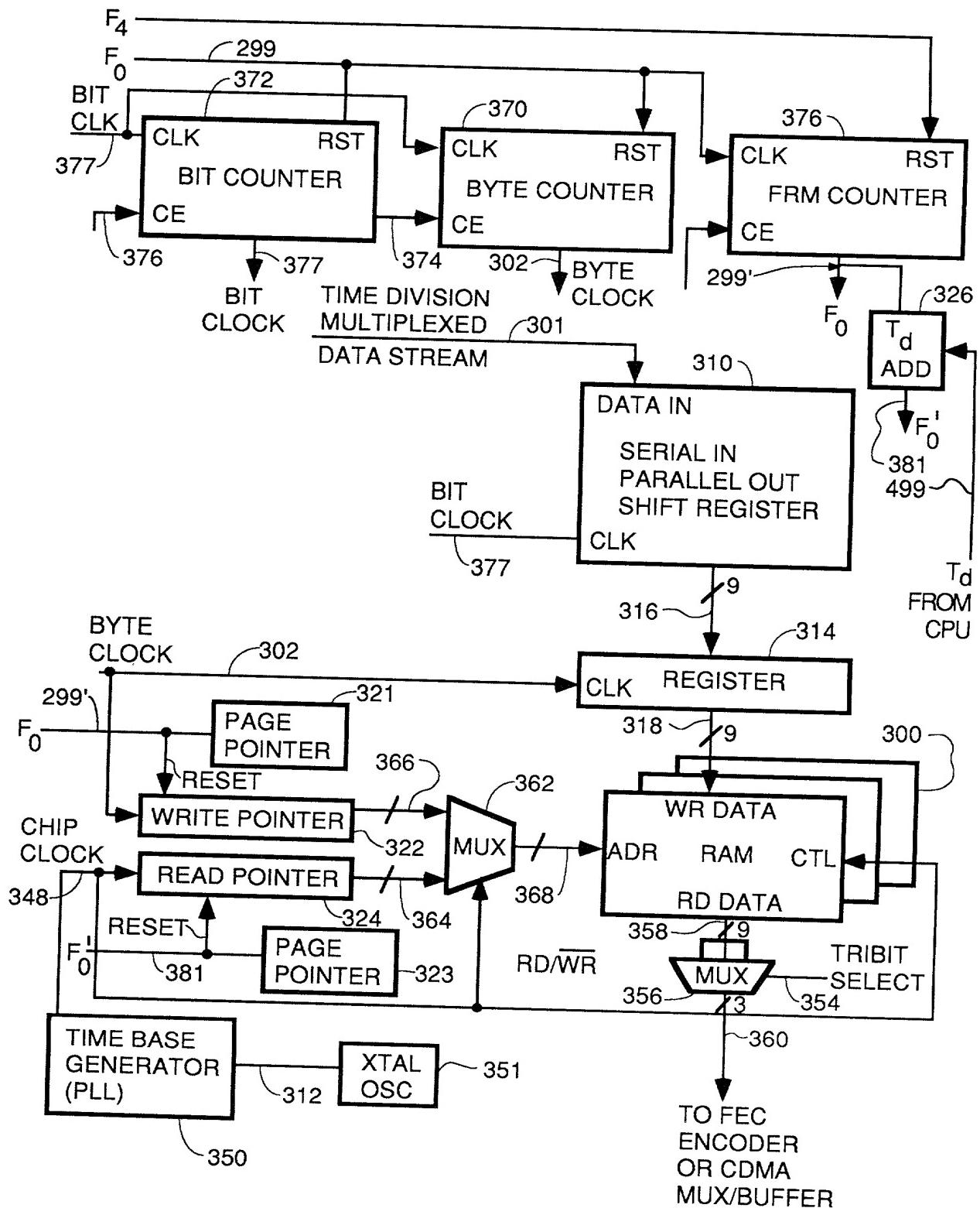


FIG. 9

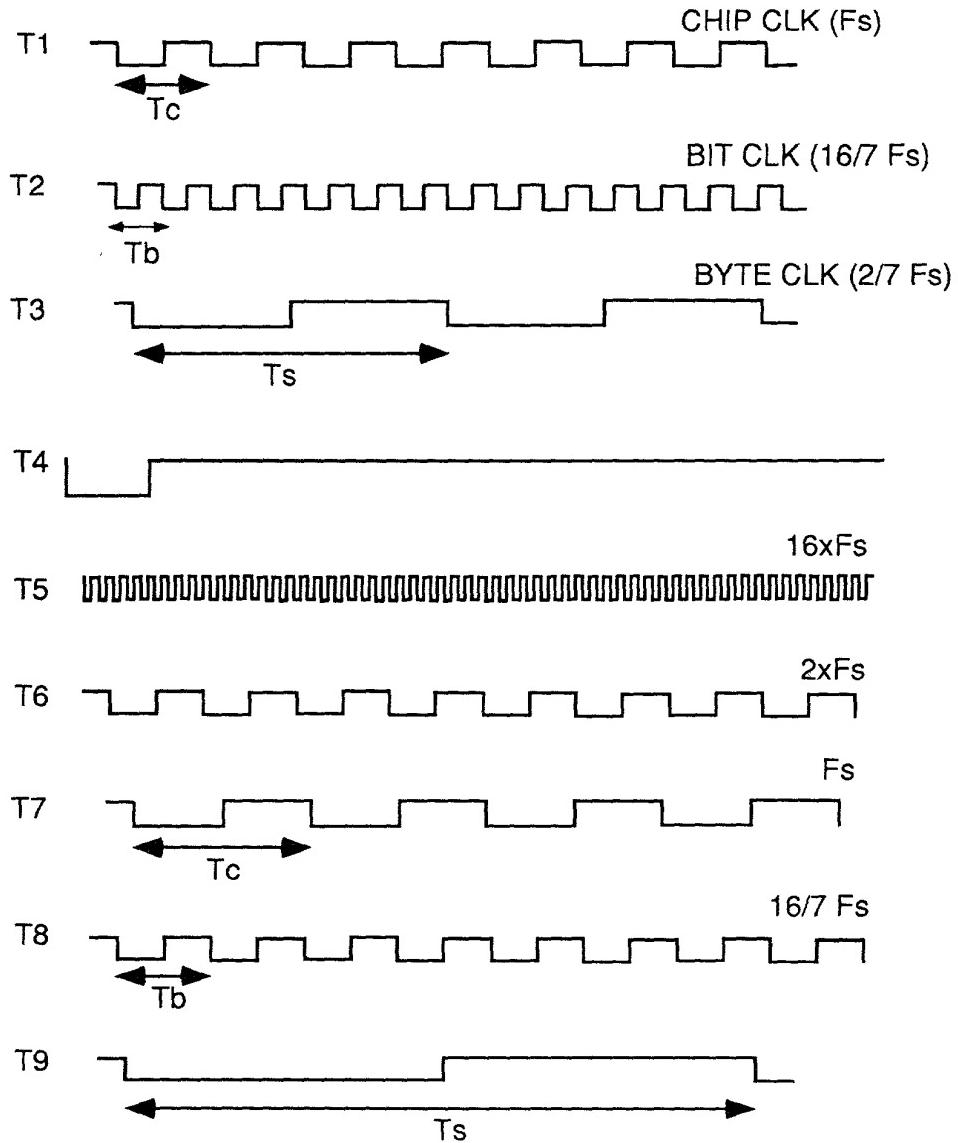


FIG. 10

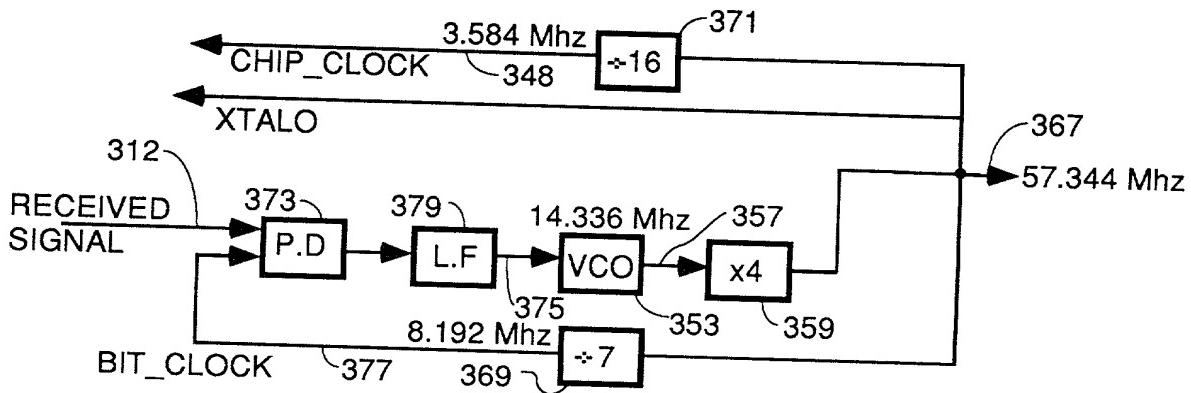


FIG. 11

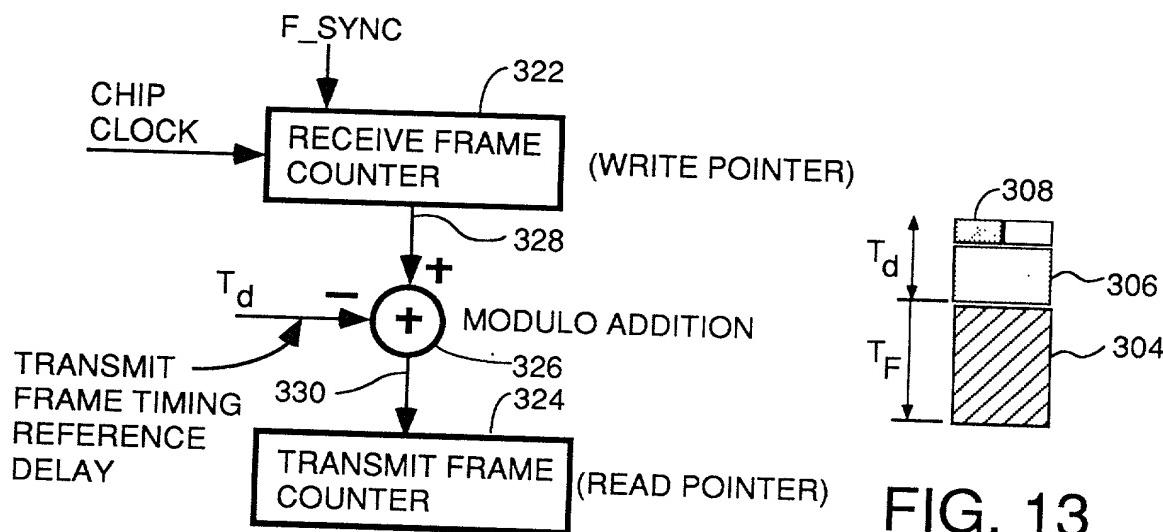


FIG. 13

FIG. 12

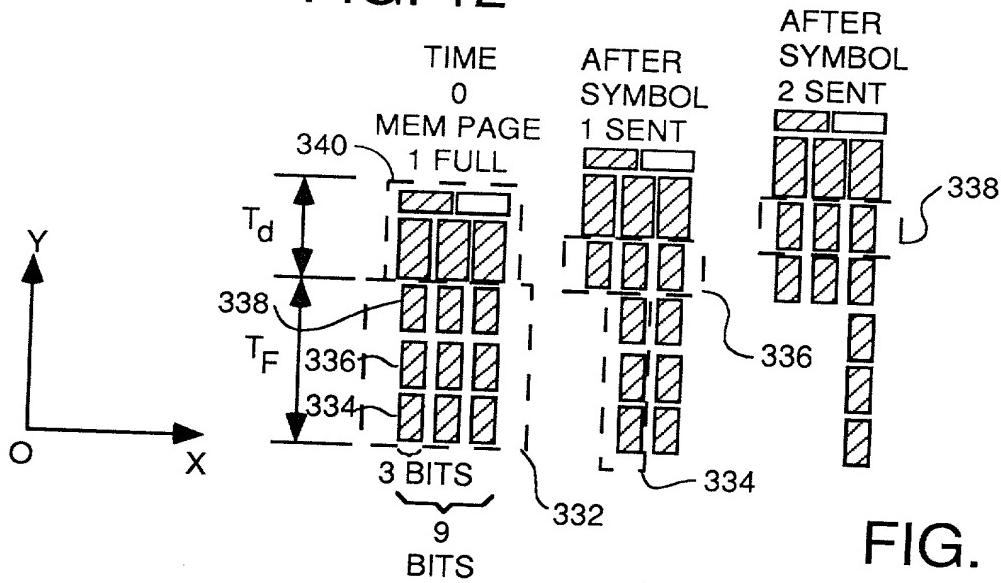


FIG. 14

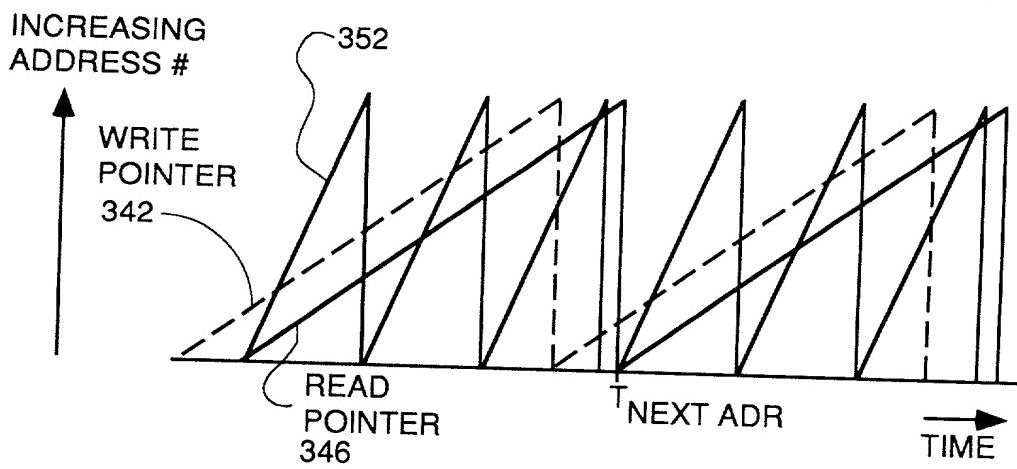


FIG. 15

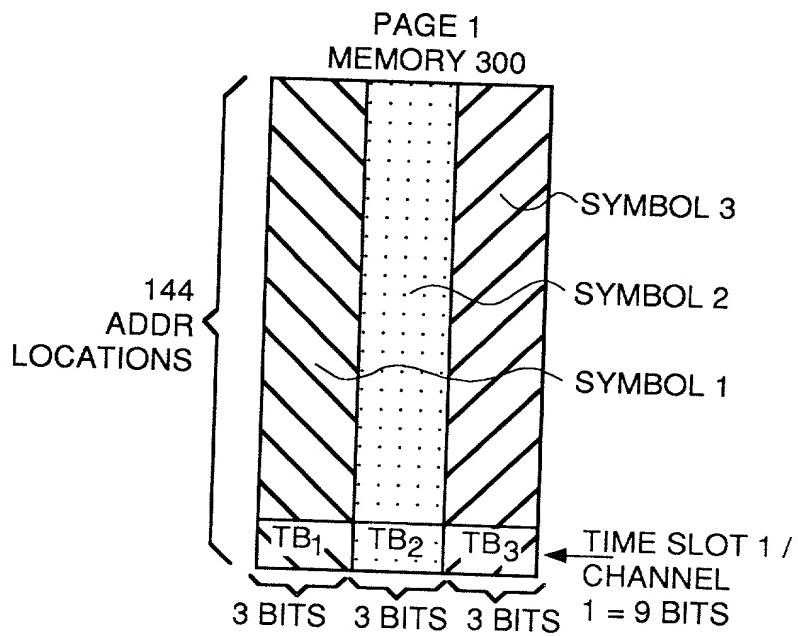
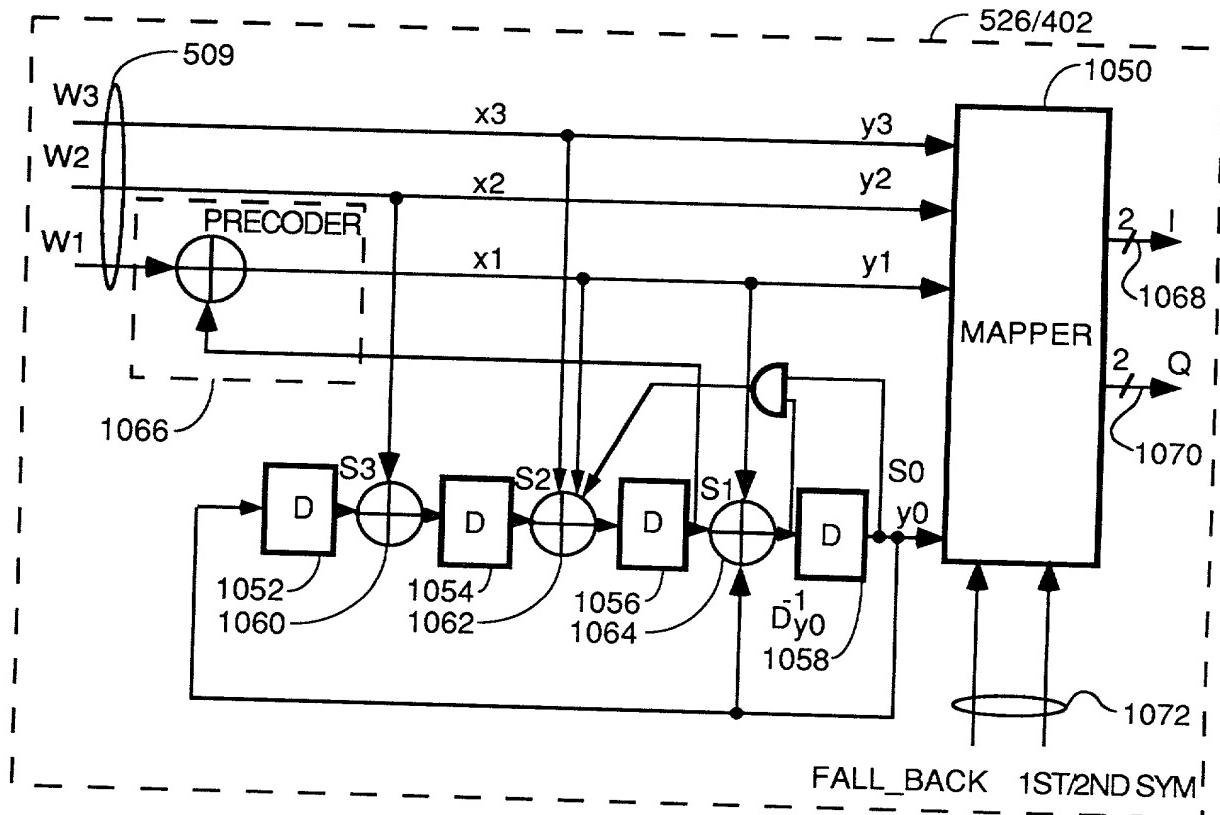


FIG. 16



PREFERRED TRELLIS ENCODER

FIG. 17

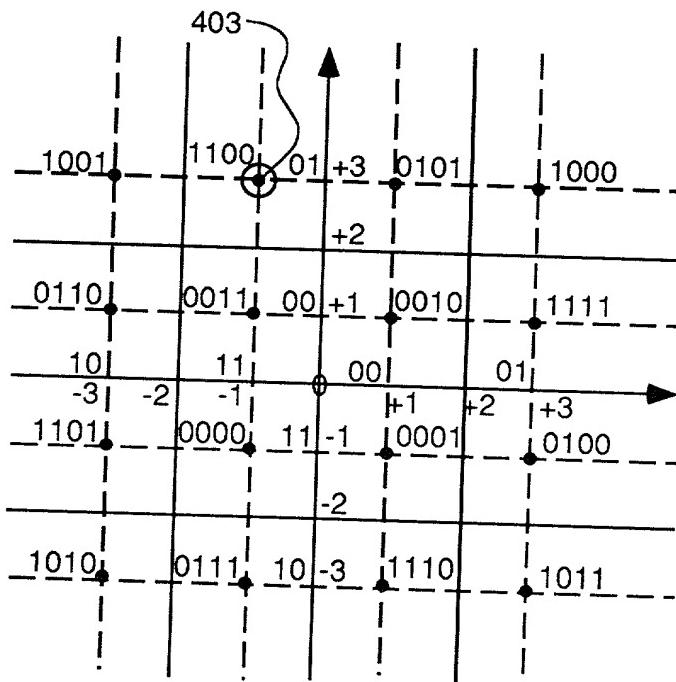


FIG. 18

0000	111	111	
0001	001	111	$= 1 - j$
0010	001	001	$= 1 + j$
0011	111	001	$= -1 + j$
0100	011	111	$= 3 - j$
0101	001	011	$= 1 + 3*j$
0110	101	001	$= -3 + j$
0111	111	101	$= -1 - 3*j$
1000	011	011	$= +3 + 3*j$
1001	101	011	$= -3 + 3*j$
1010	101	101	$= -3 - 3*j$
1011	011	101	$= 3 - 3*j$
1100	111	011	$= -1 + 3*j$
1101	101	111	$= -3 - j$
1110	001	101	$= 1 - 3*j$
1111	011	001	$= 3 + j$

FIG. 19

INFORMATION
VECTOR [B]
FOR EACH
SYMBOL

ORTHOGONAL
CODE MATRIX

$$\begin{array}{c}
 \text{483} \\
 \text{481}
 \end{array}
 \begin{bmatrix}
 0 & 1 & 1 & 0 \\
 1 & 1 & 1 & 1 \\
 1 & 1 & 0 & 1 \\
 0 & 1 & 0 & 0 \\
 \vdots & \vdots & & \vdots
 \end{bmatrix}
 \times
 \begin{bmatrix}
 c_{1,1} & c_{1,2} & \cdots & c_{1,144} \\
 c_{2,1} & c_{2,2} & \cdots & c_{2,144} \\
 \vdots & \vdots & & \vdots
 \end{bmatrix}$$

FIG. 20A

REAL
PART OF
INFO
VECTOR
[b] FOR
FIRST
SYMBOL

405

$$\begin{bmatrix}
 +3 \\
 -1 \\
 -1 \\
 +3
 \end{bmatrix}
 \cdot
 \begin{bmatrix}
 1 & 1 & 1 & 1 \\
 -1 & -1 & 1 & 1 \\
 -1 & 1 & -1 & 1 \\
 -1 & 1 & 1 & -1
 \end{bmatrix}
 = 407$$

REAL
PART OF
RESULT
VECTOR

409

$$\begin{bmatrix}
 4 \\
 0 \\
 0 \\
 -8
 \end{bmatrix}$$

$[b_{\text{REAL}}] \times [\text{CODE MATRIX}] = [R_{\text{REAL}}] = \text{"CHIPS OUT" ARRAY-REAL}$

FIG. 20B

MAPPING FOR FALL-BACK MODE - LSB'S

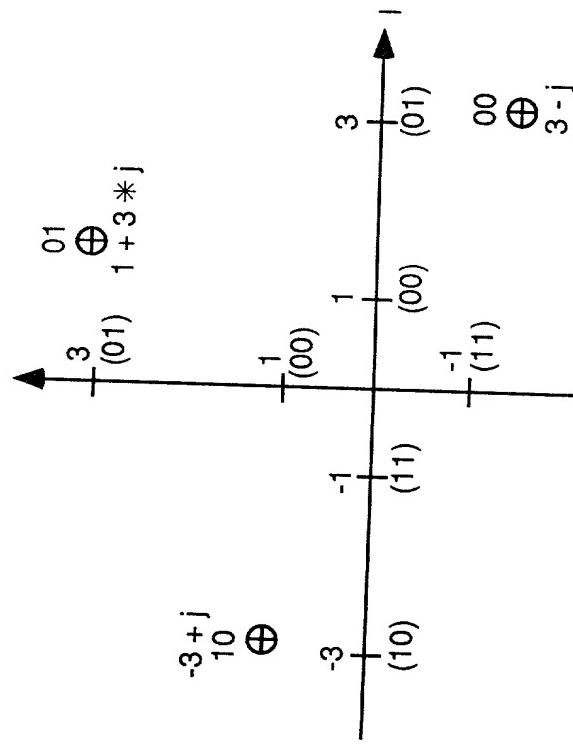


FIG. 21

MSBs y3 y2	PHASE difference (2nd-1st symbol)	1+iQ WHEN LSB=00	1+iQ WHEN LSB=01	1+iQ WHEN LSB=10	1+iQ WHEN LSB=11
00	0	0	3-j	1+j3	-3+j
01	90	1+j3	90	1+j3	-1-j3
10	180	-3+j	180	-3+j	3-j
11	-90	-1-j3	-90	-1-j3	1+j3

LSBs y1 y0	PHASE	1+jQ
00	0	3-j
01	90	1+j3
10	180	-3+j
11	-90	-1-j3

FIG. 21

LSB & MSB FALLBACK MODE MAPPINGS

FIG. 22

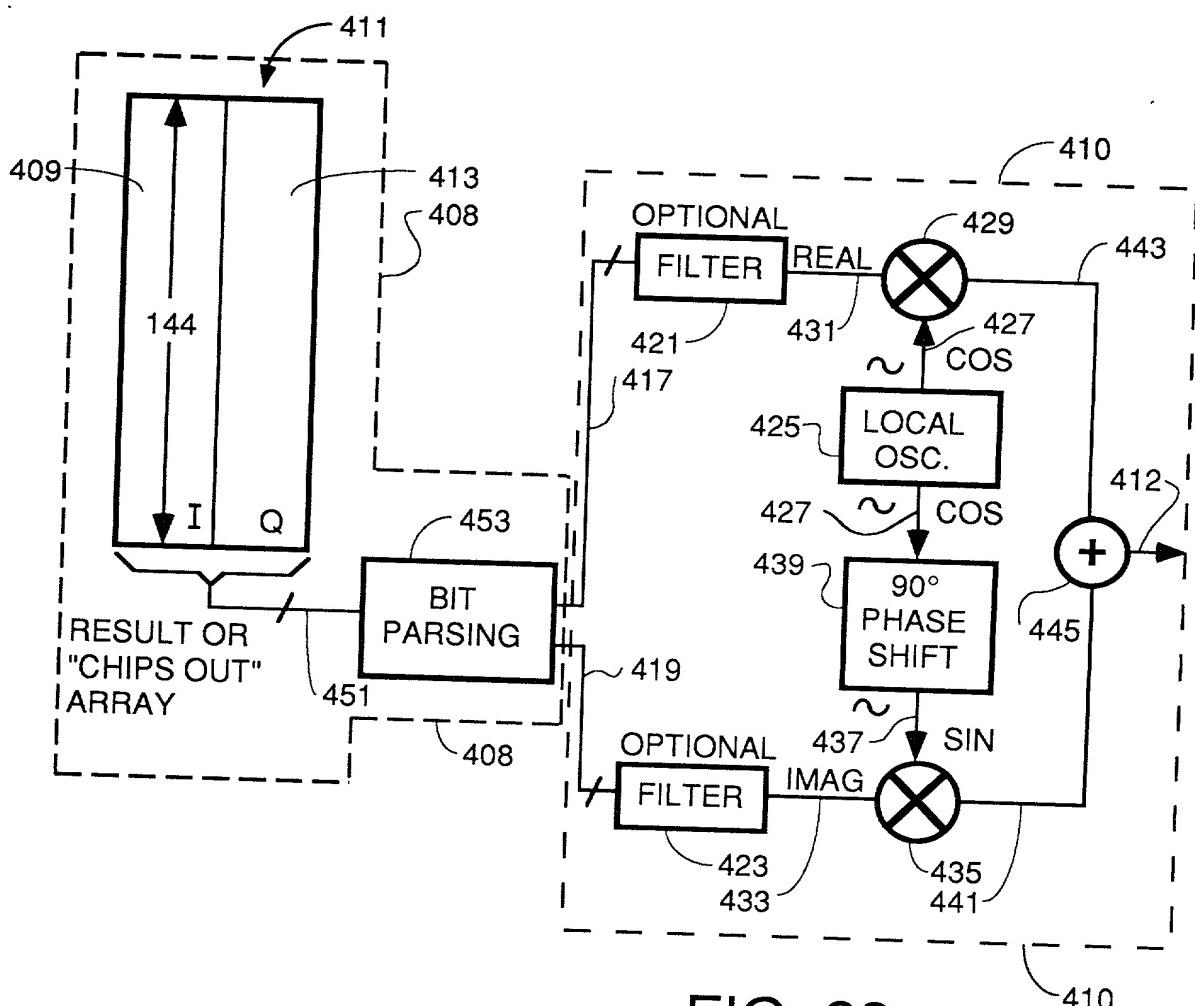


FIG. 23

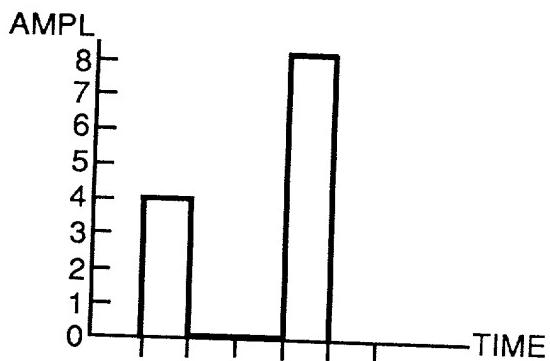


FIG. 24

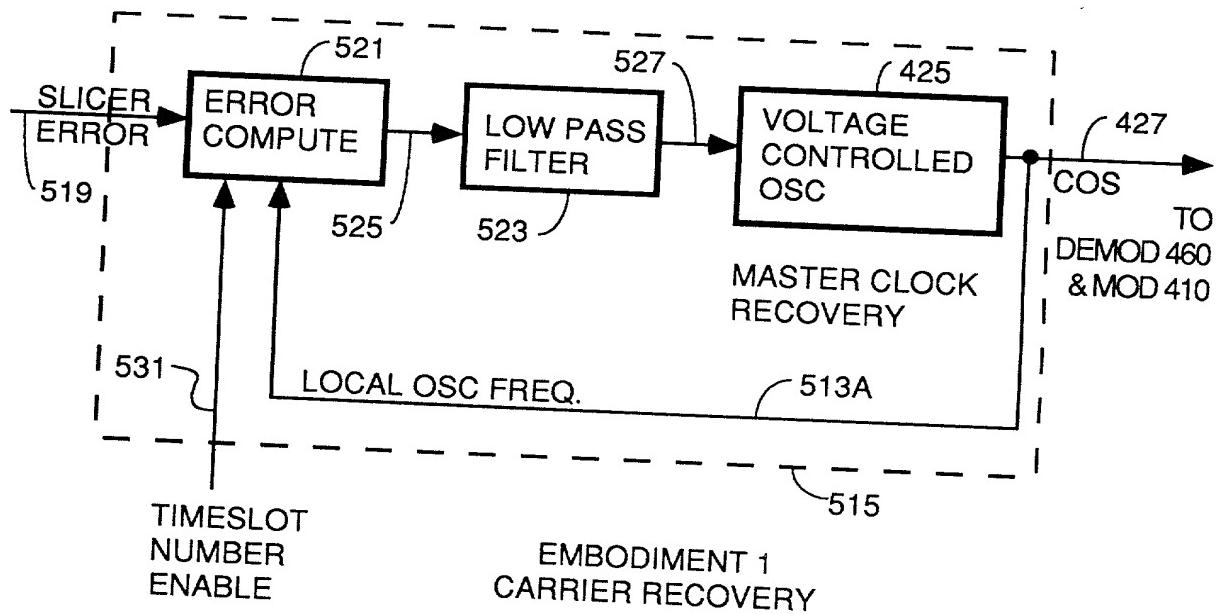


FIG. 25

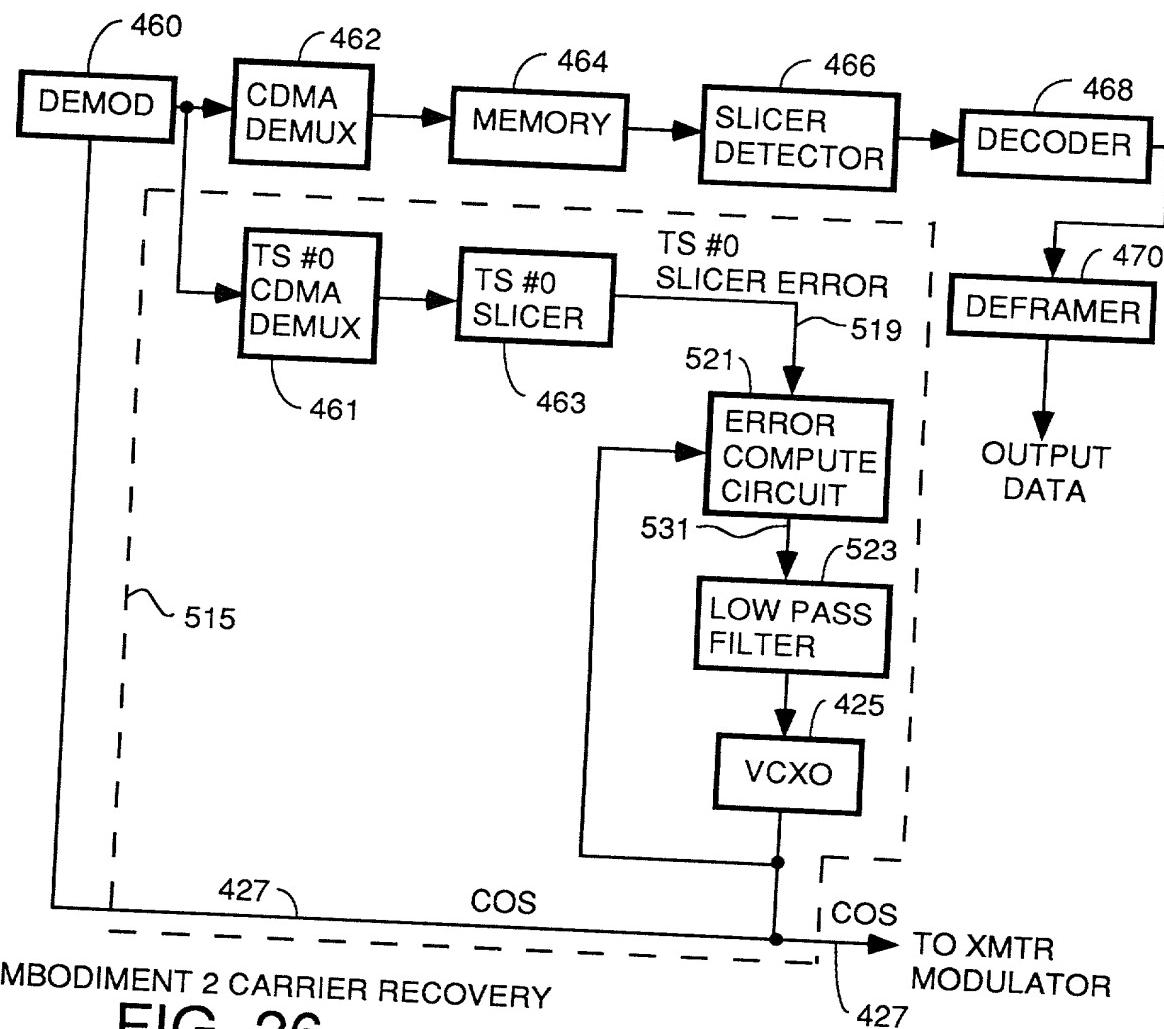


FIG. 26

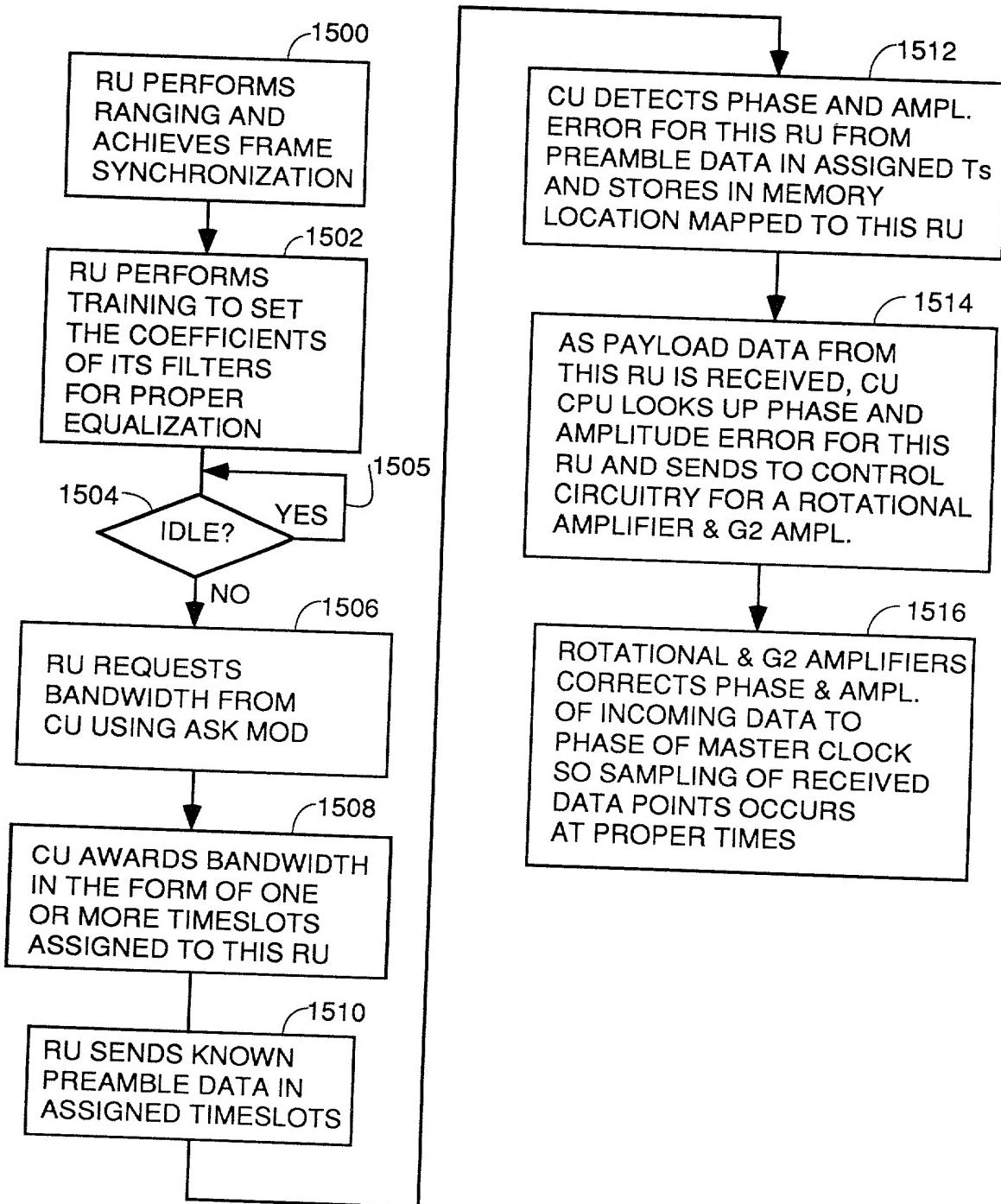


FIG. 27

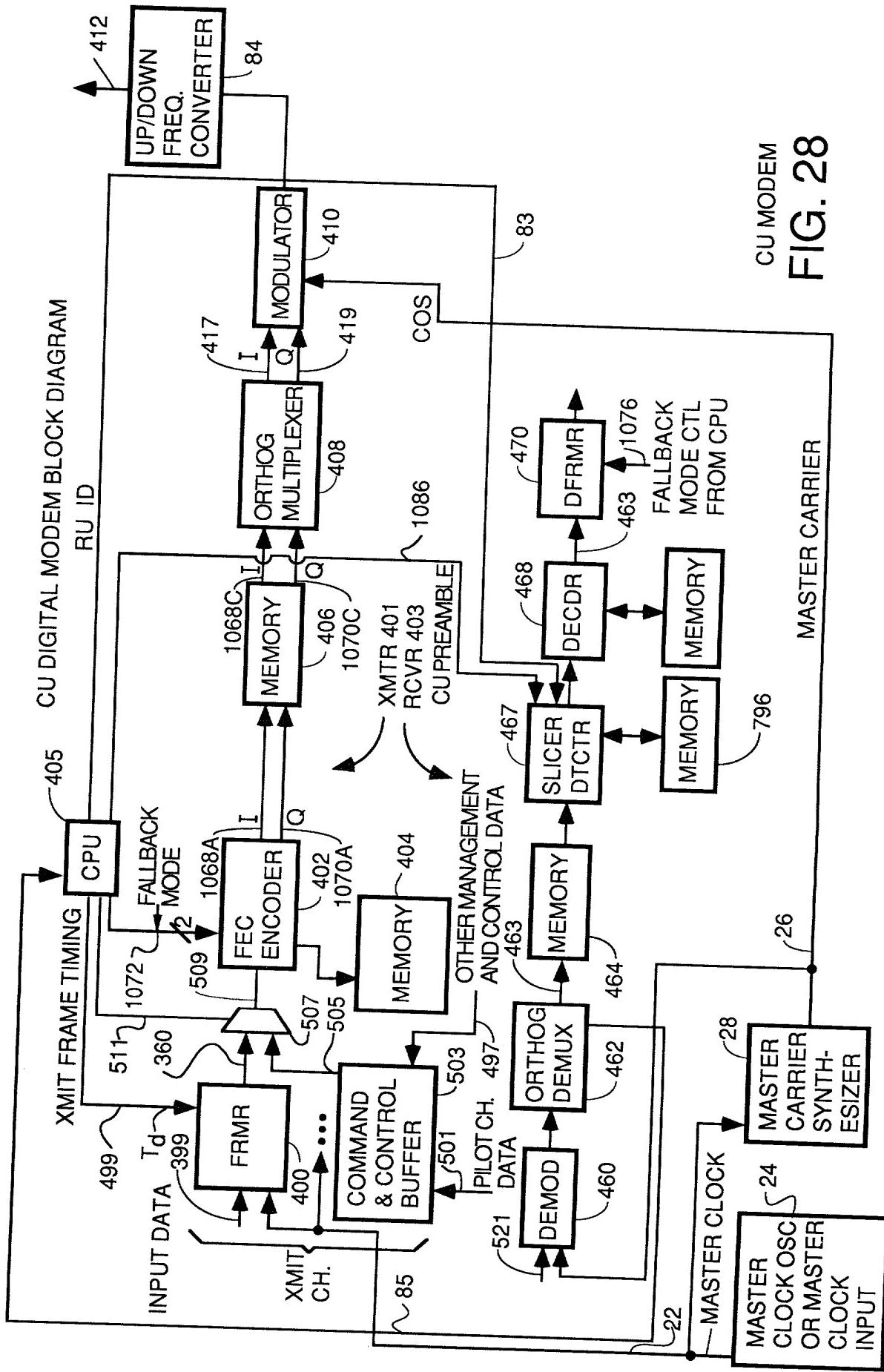


FIG. 28

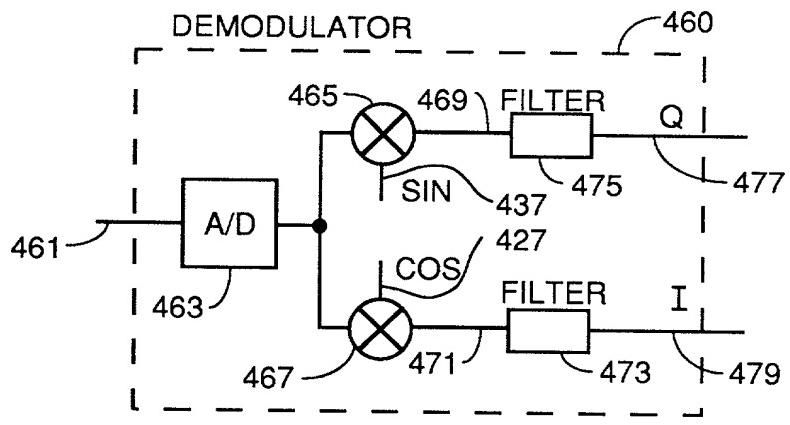


FIG. 29

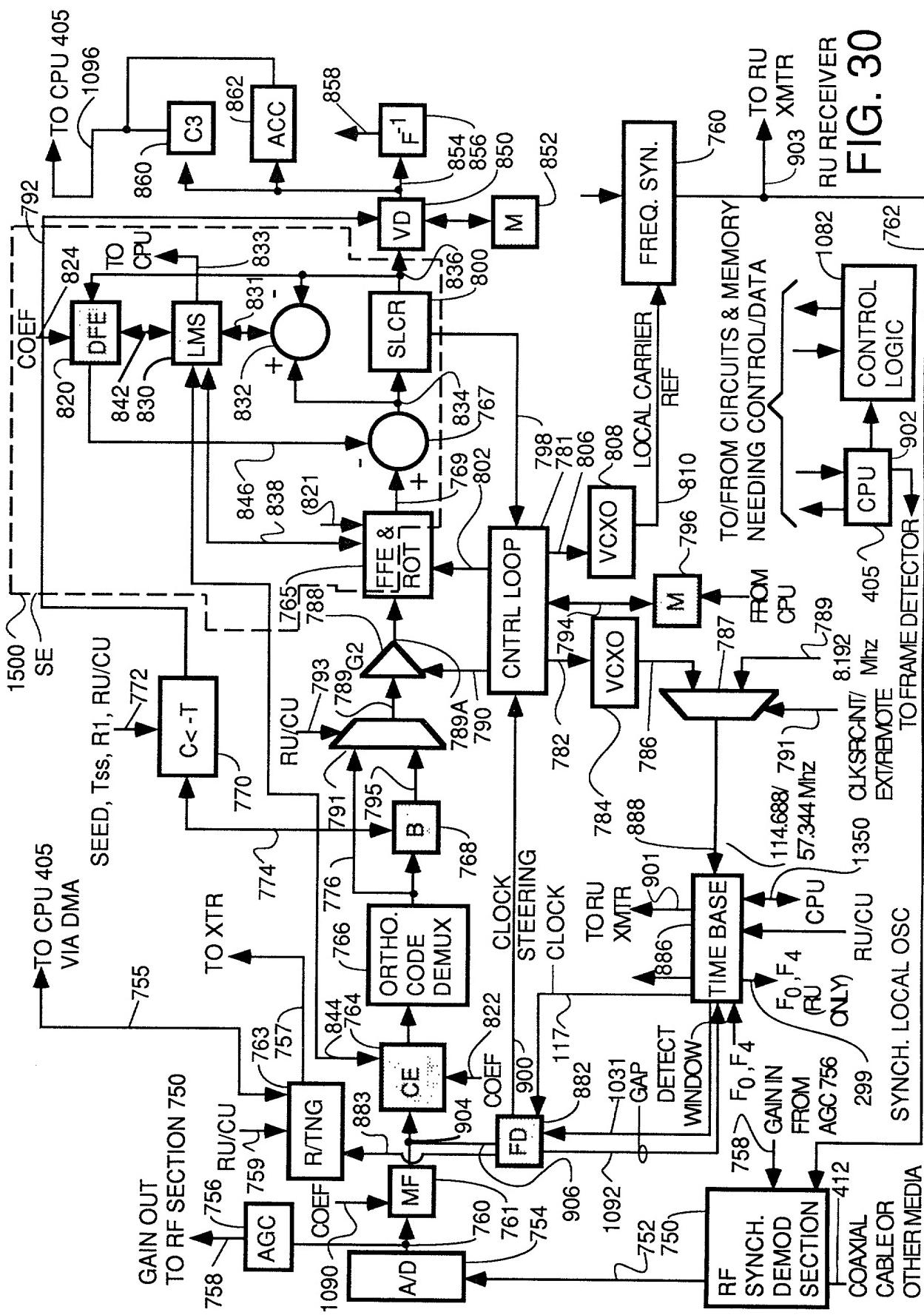
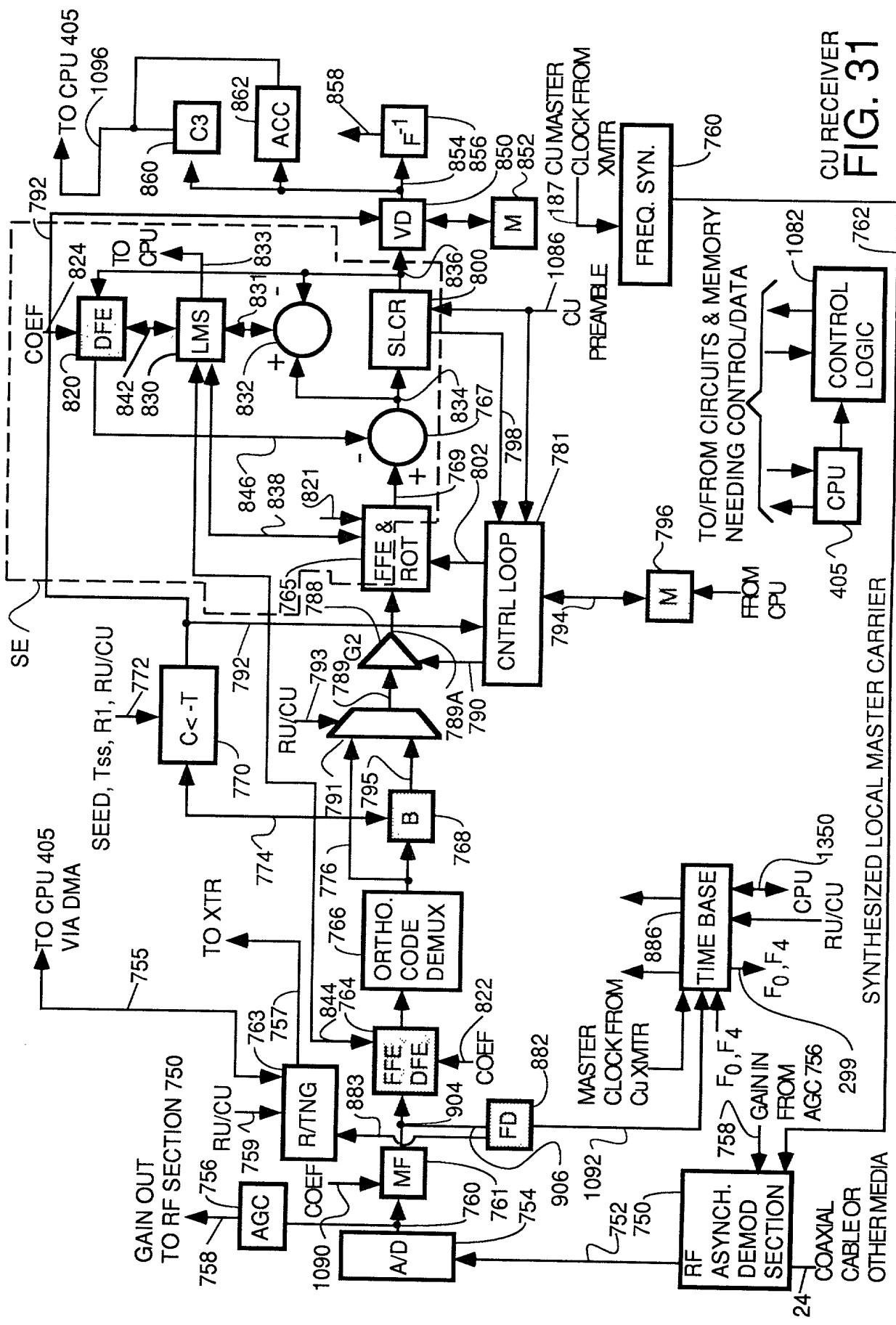


FIG. 30



CU RECEIVER
FIG. 31

CU TRANSMITTER
FIG. 32

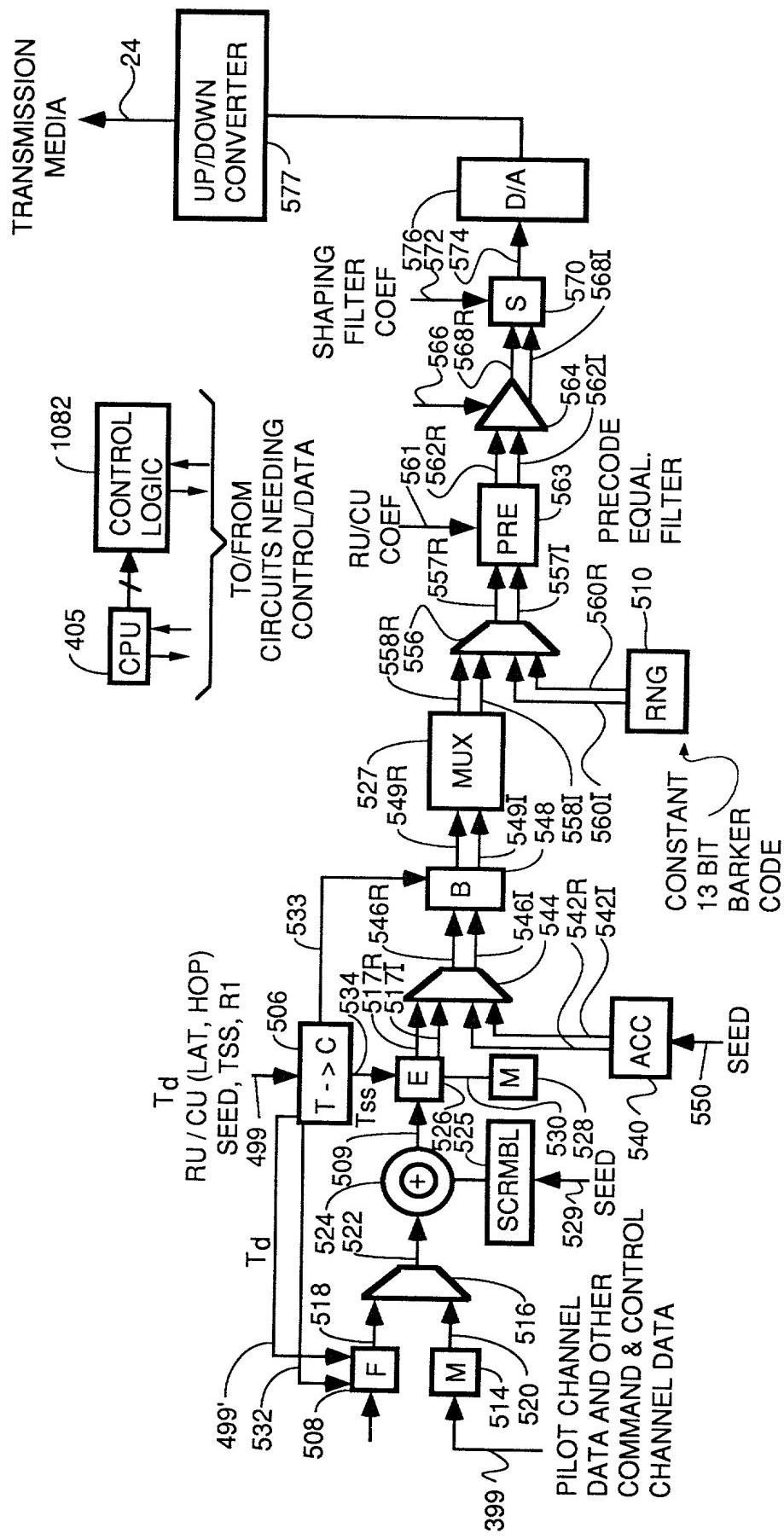
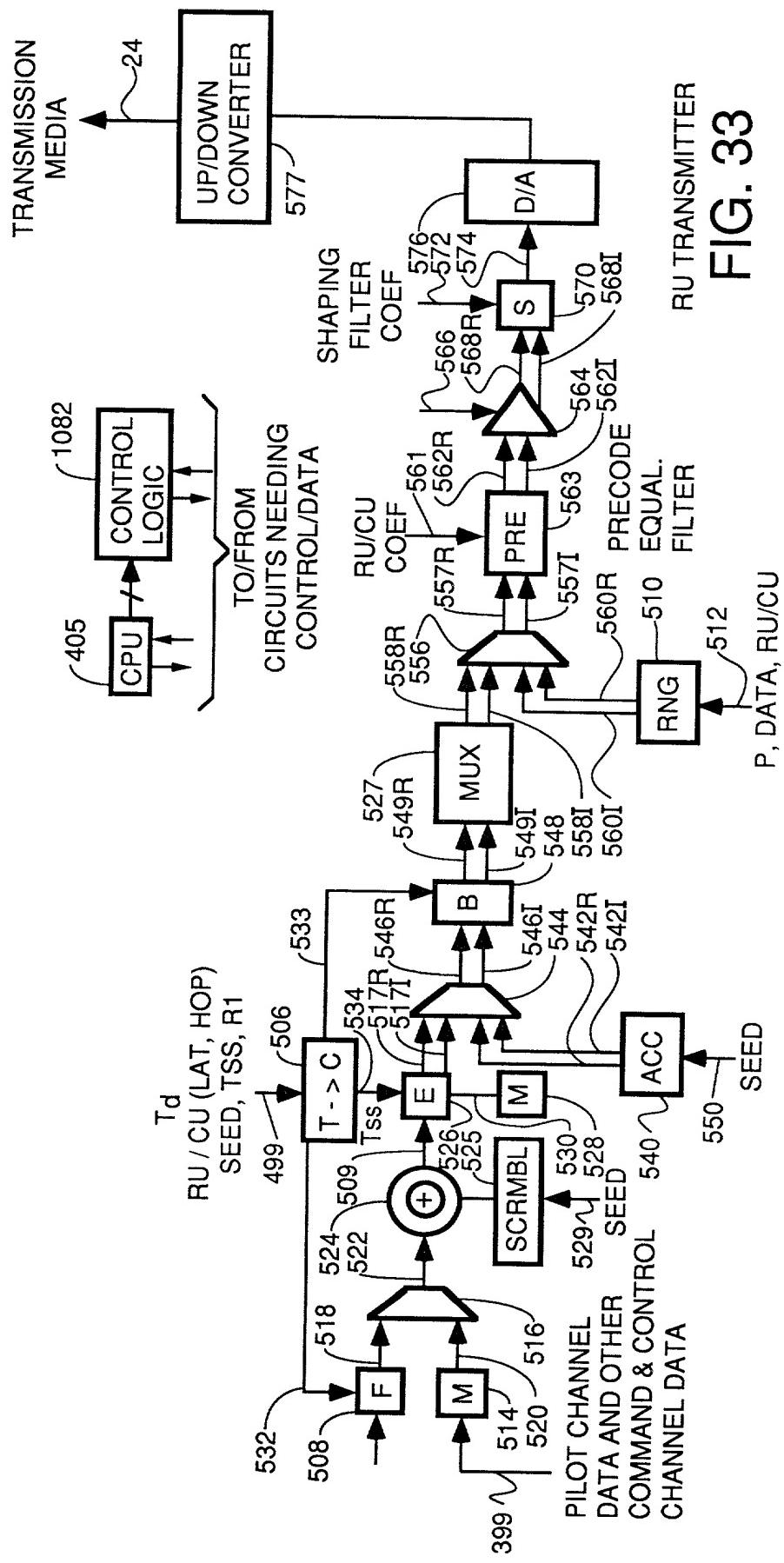


FIG. 33



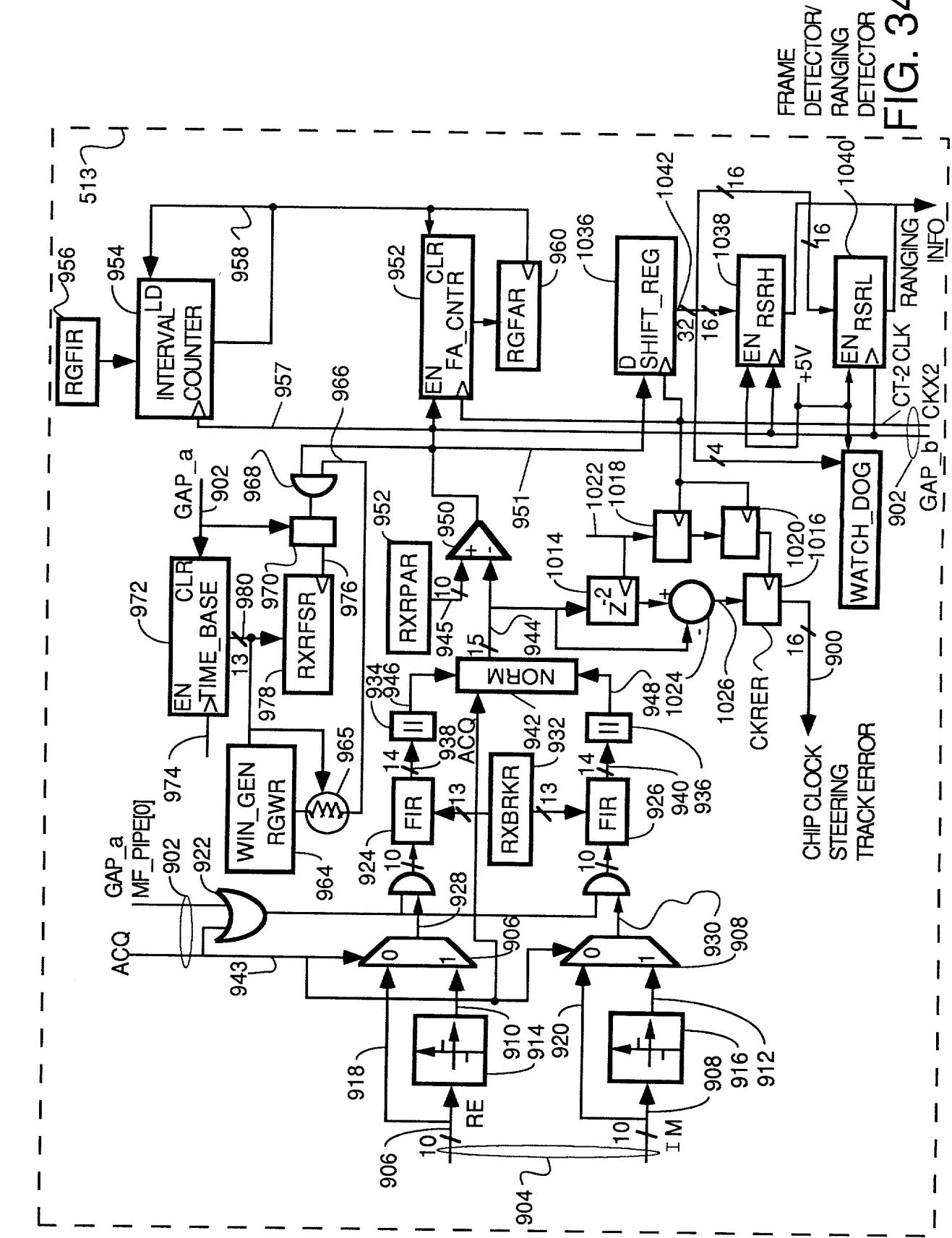


FIG. 34

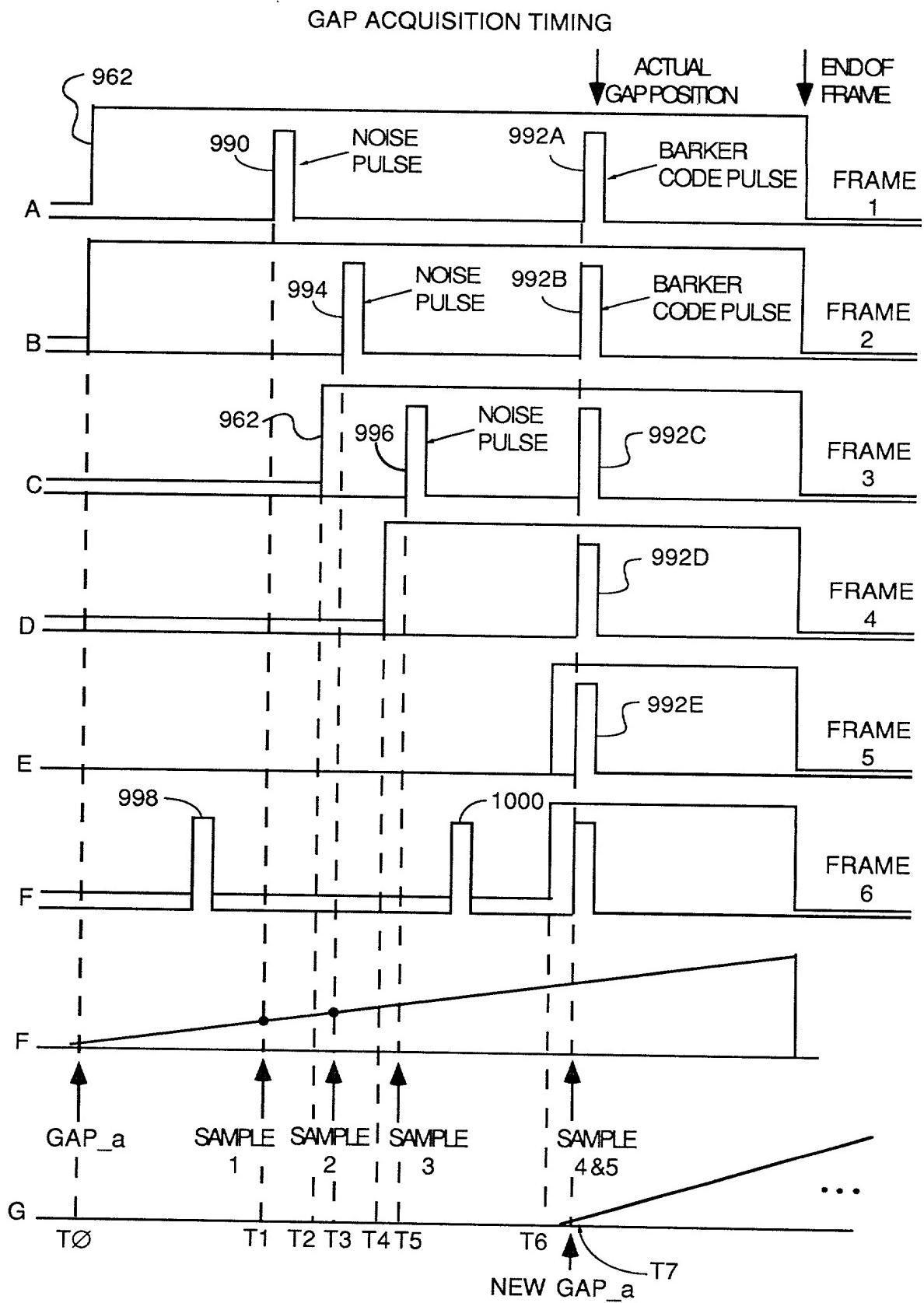


FIG. 35

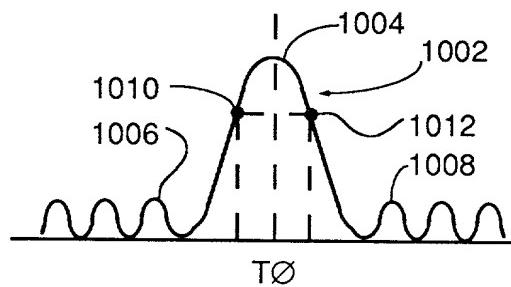


FIG. 36

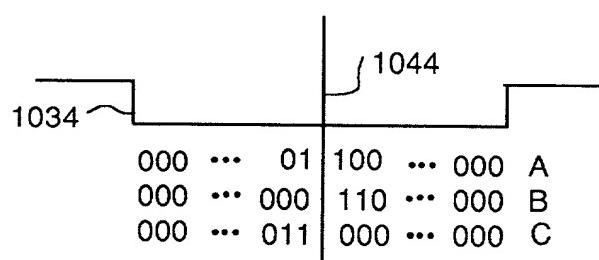


FIG. 37

FINE TUNING TO
CENTER BARKER CODE

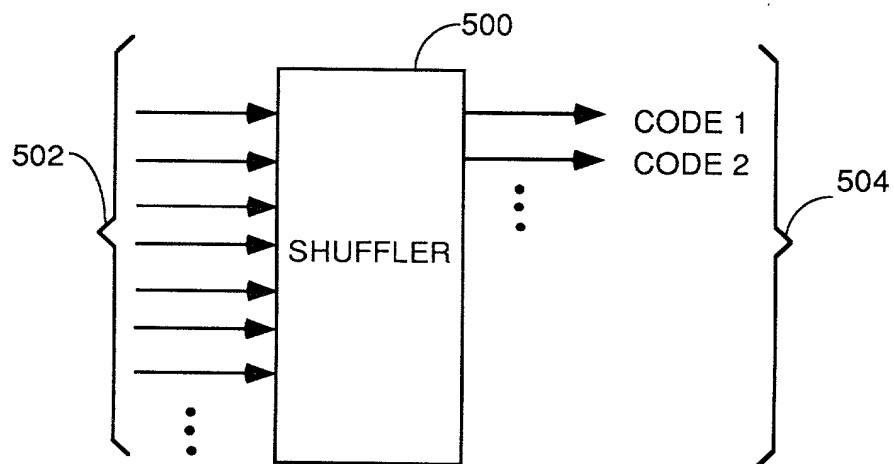
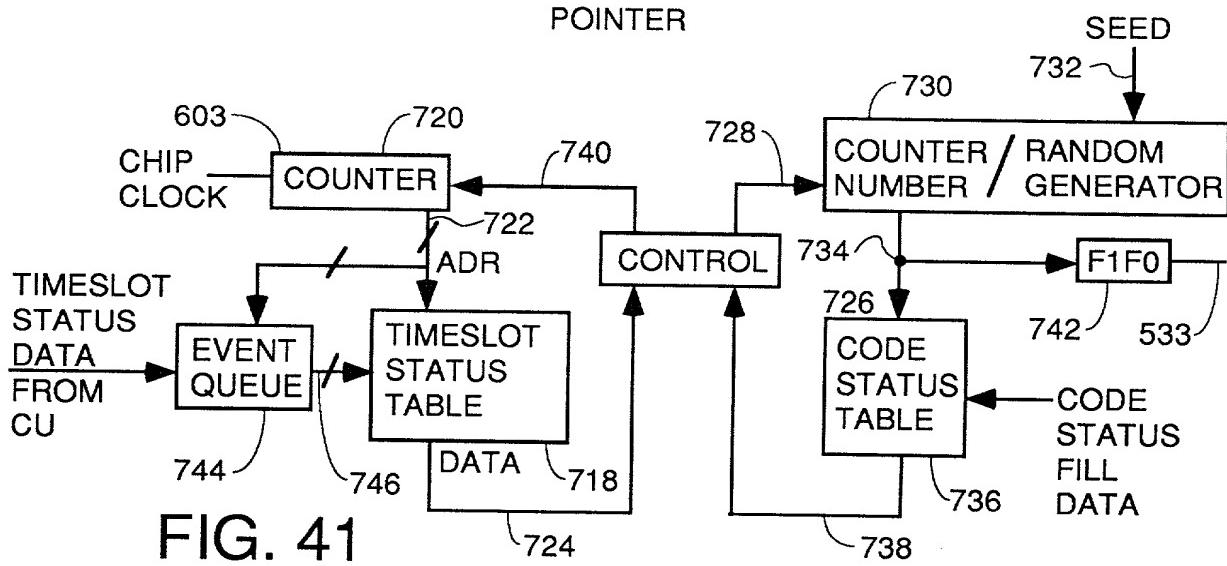
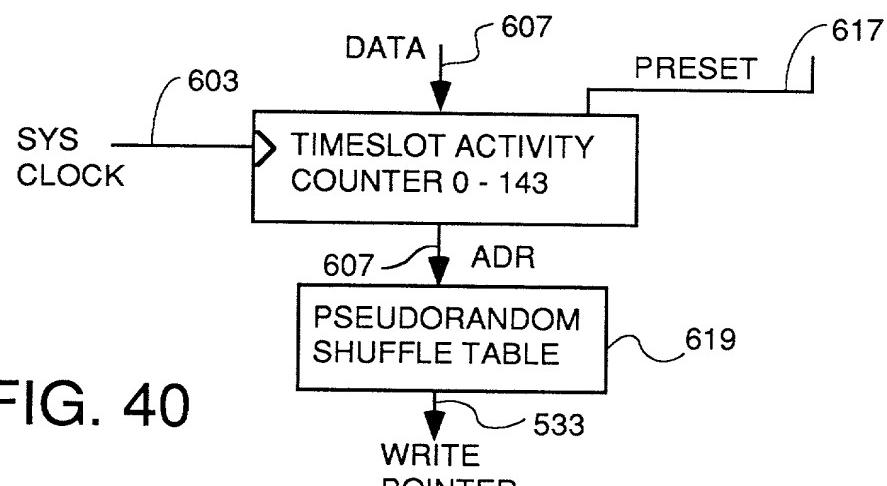
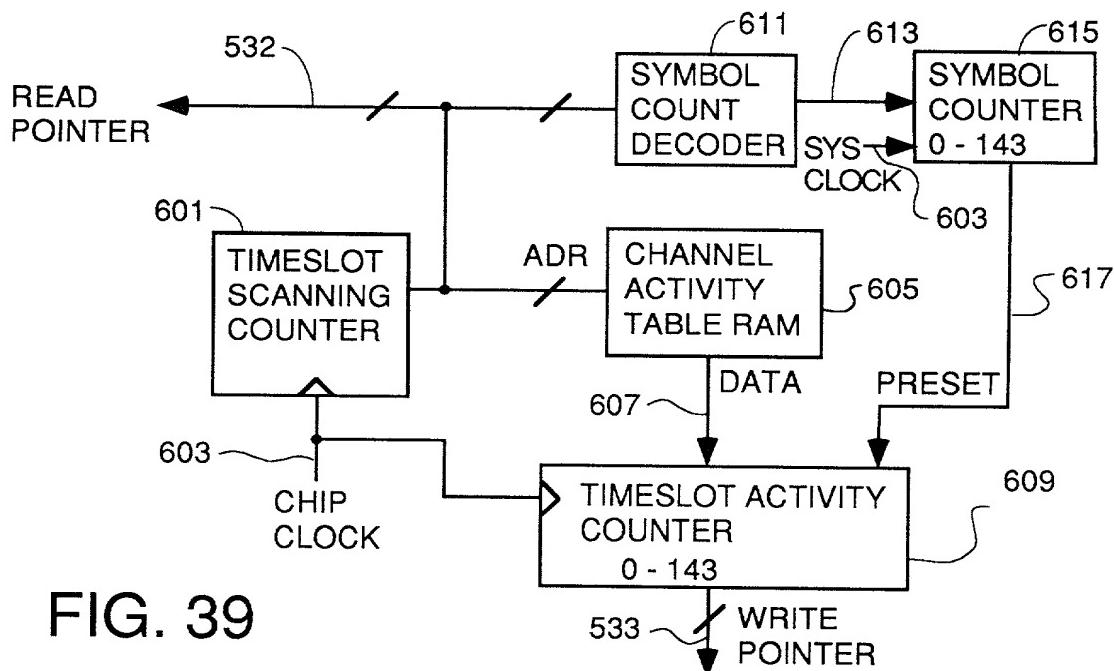


FIG. 38



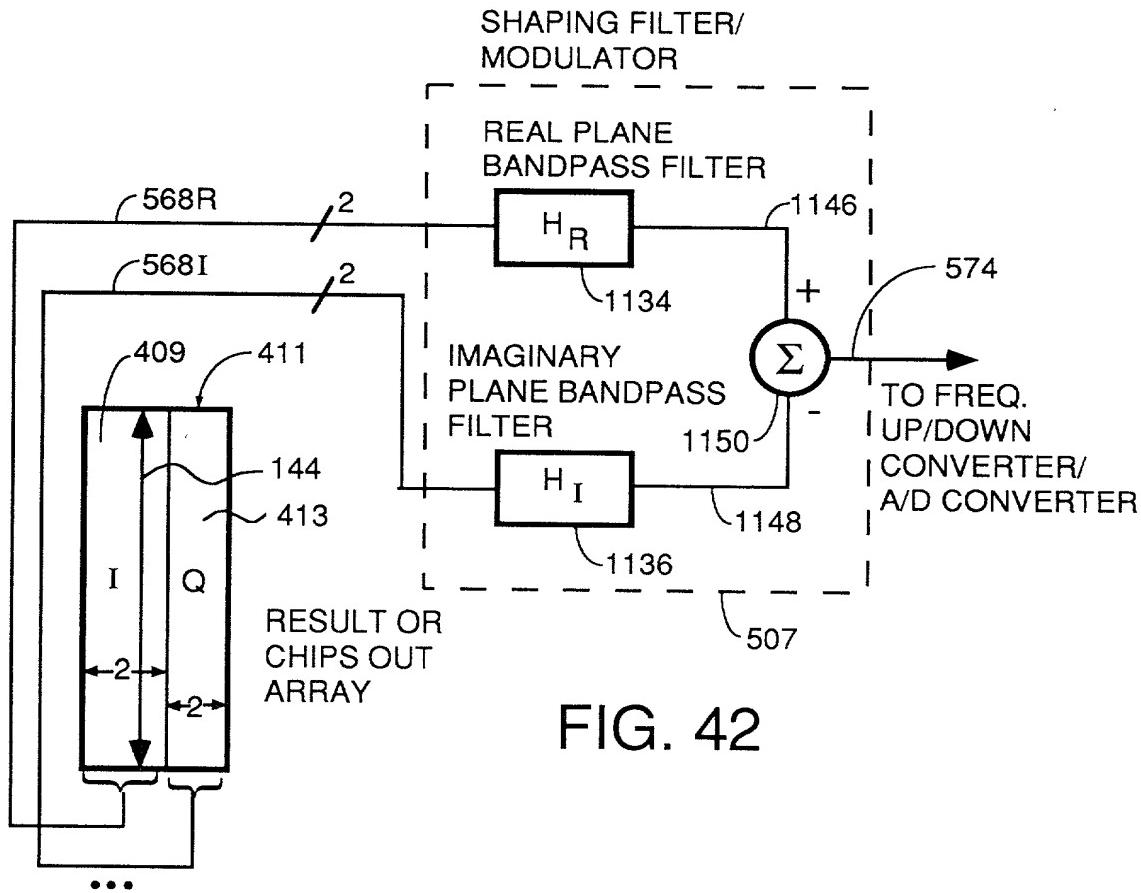


FIG. 42

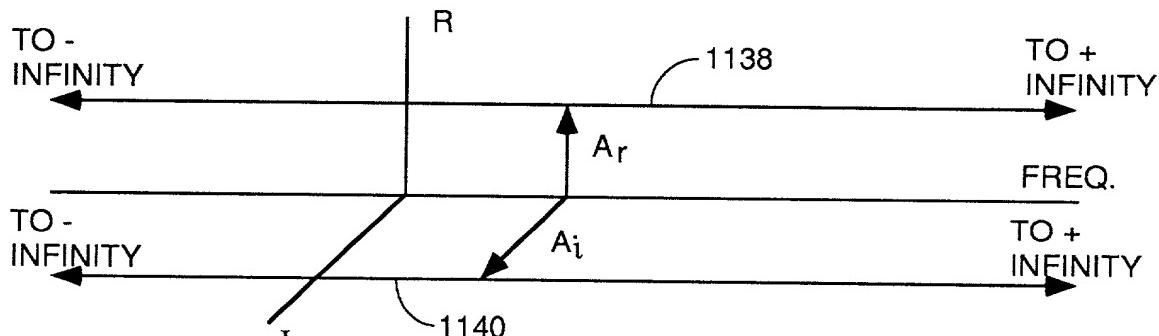


FIG. 43

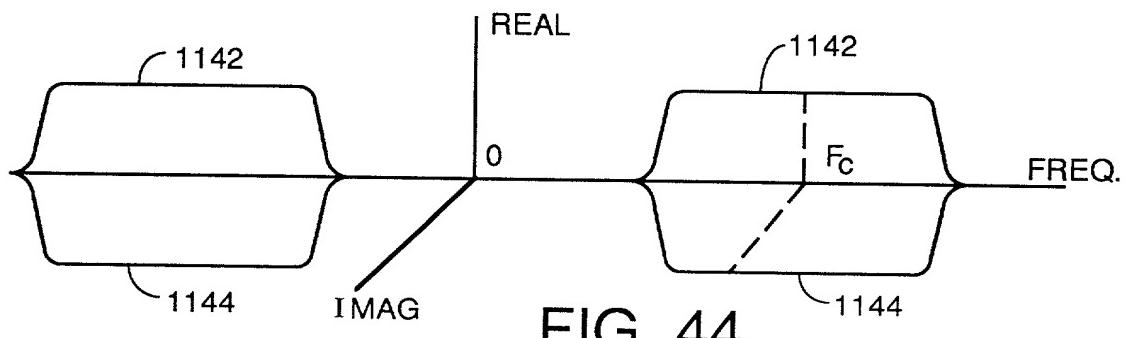
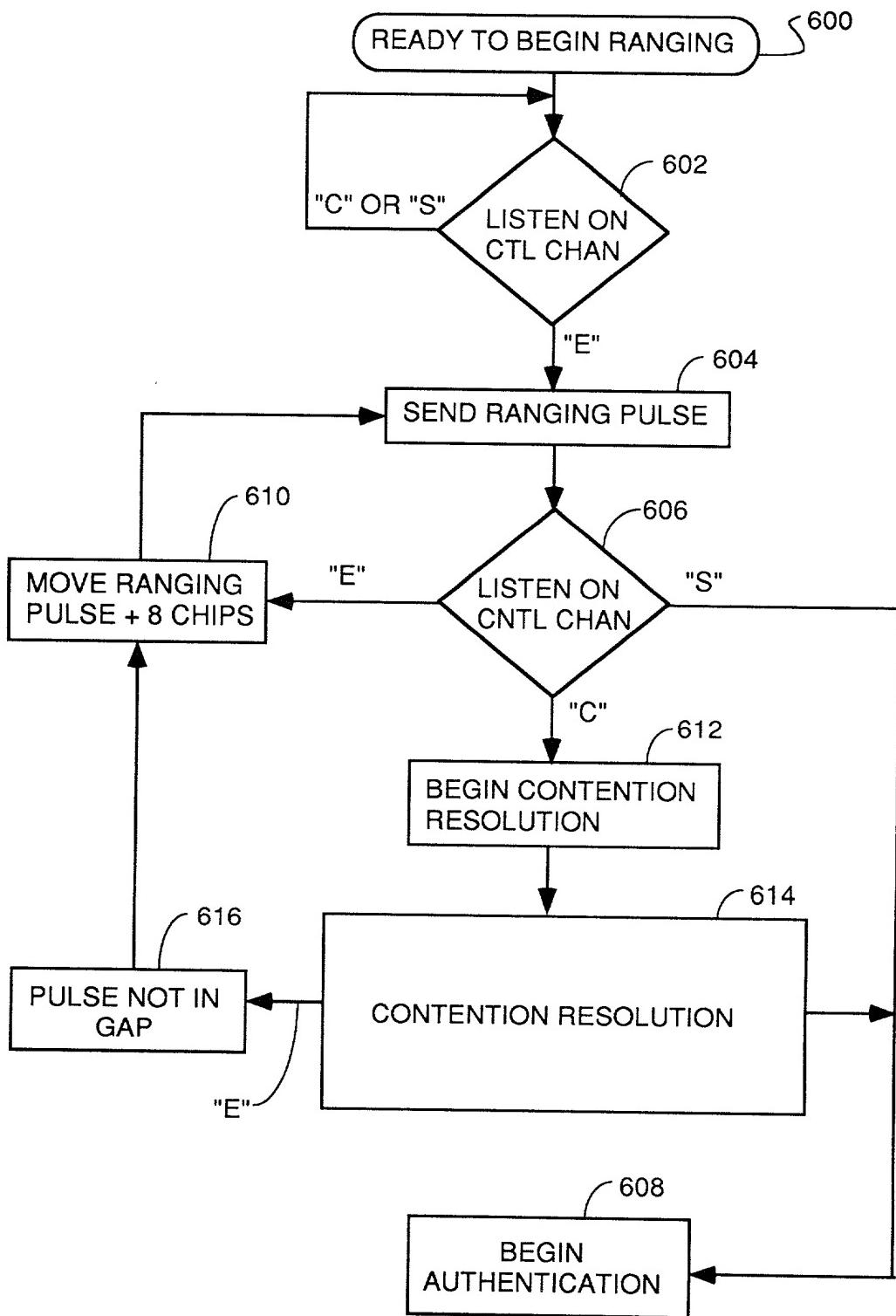


FIG. 44



RU RANGING
FIG. 45

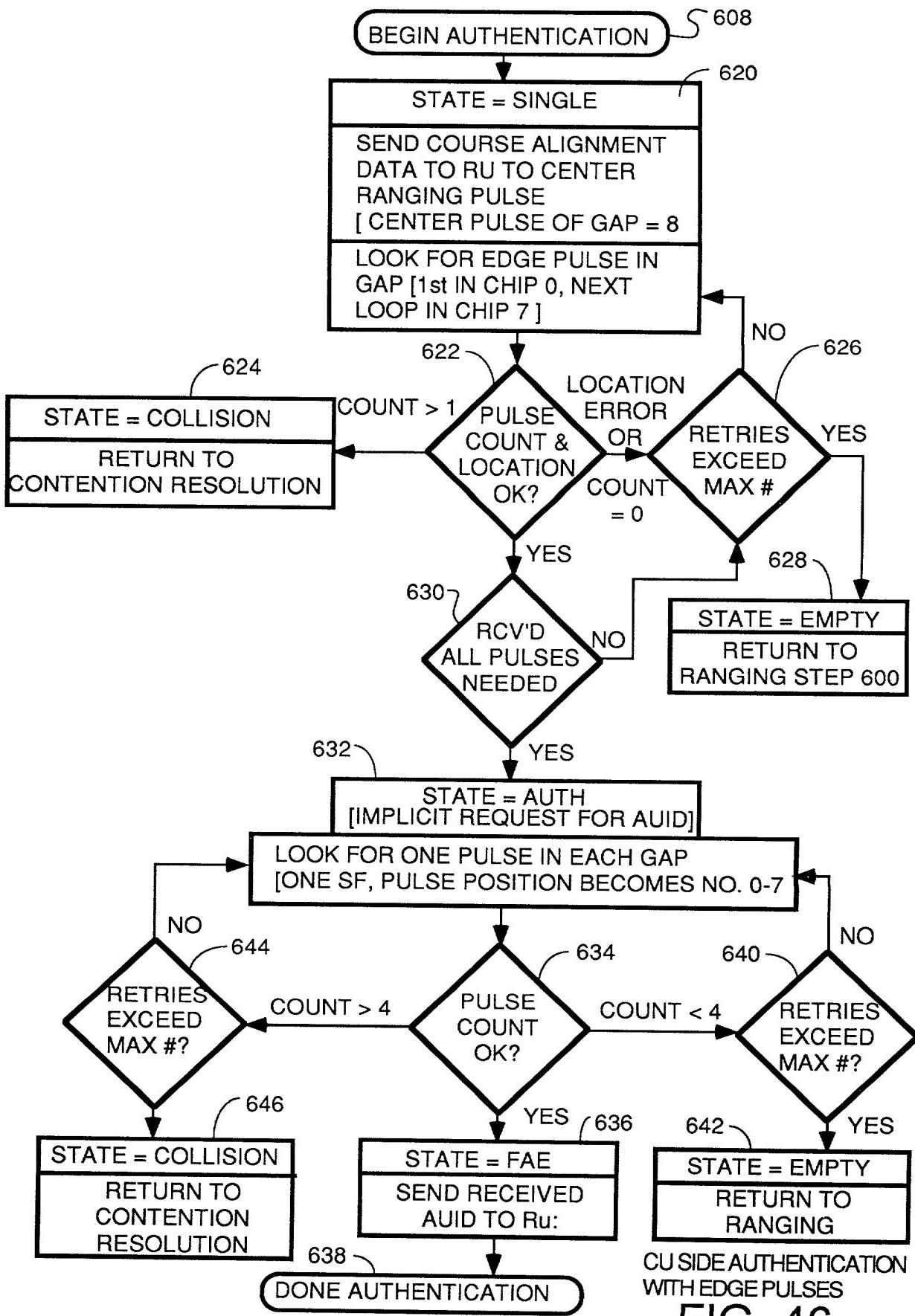
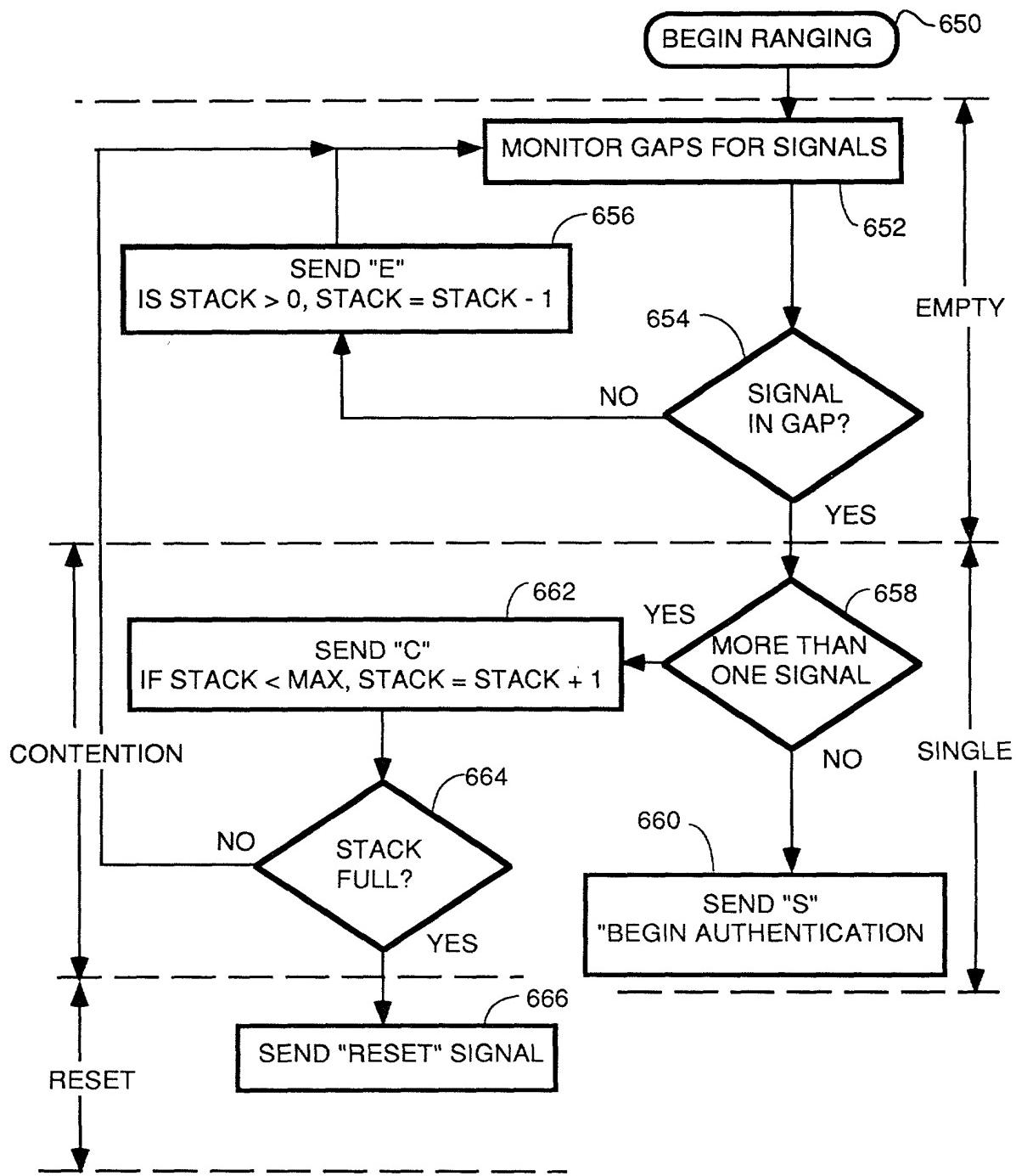
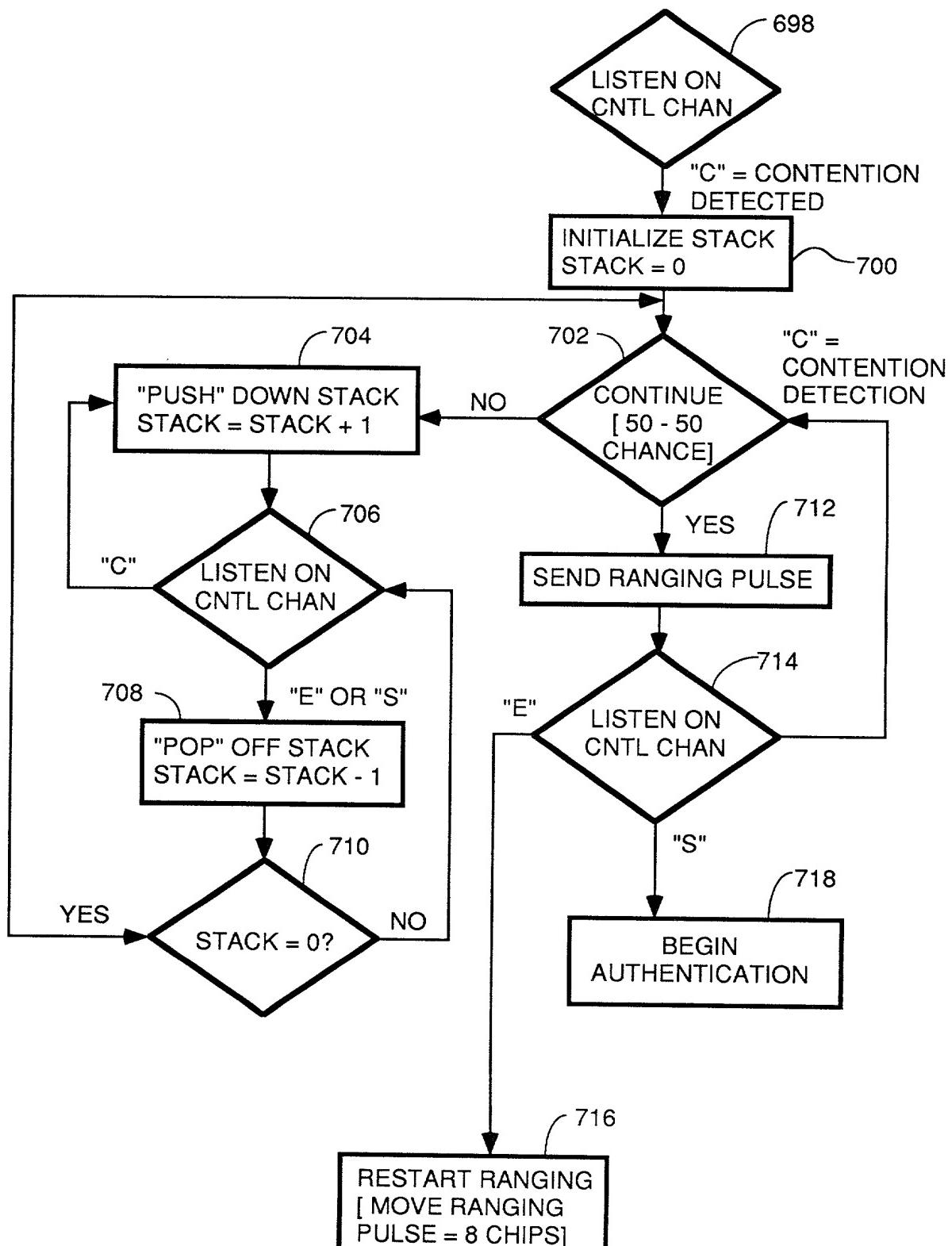


FIG. 46



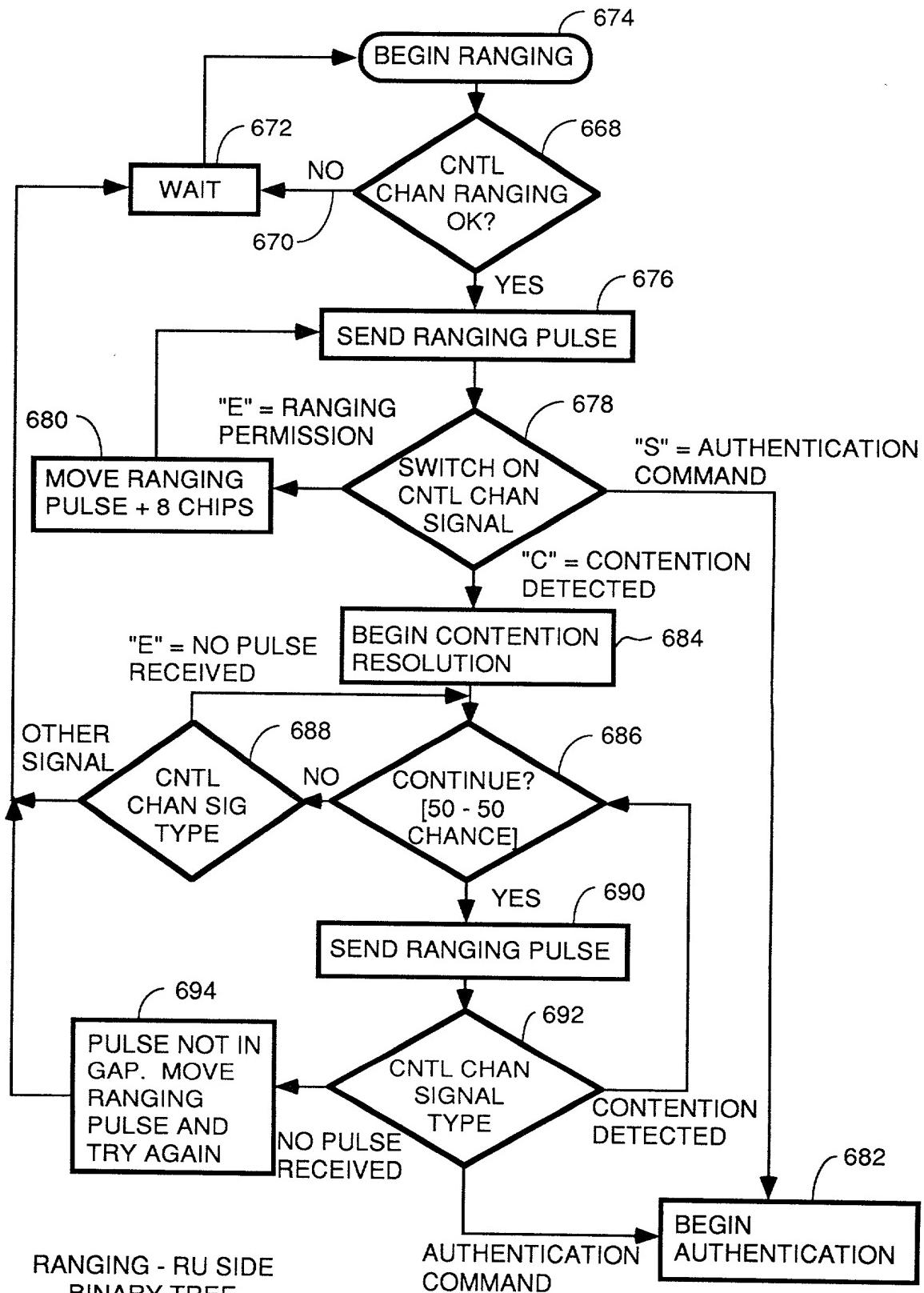
CU RANGING AND CONTENTION RESOLUTION

FIG. 47



CONTENTION RESOLUTION - RU
USING BINARY STACK

FIG. 48



RANGING - RU SIDE BINARY TREE ALGORITHM

FIG. 49

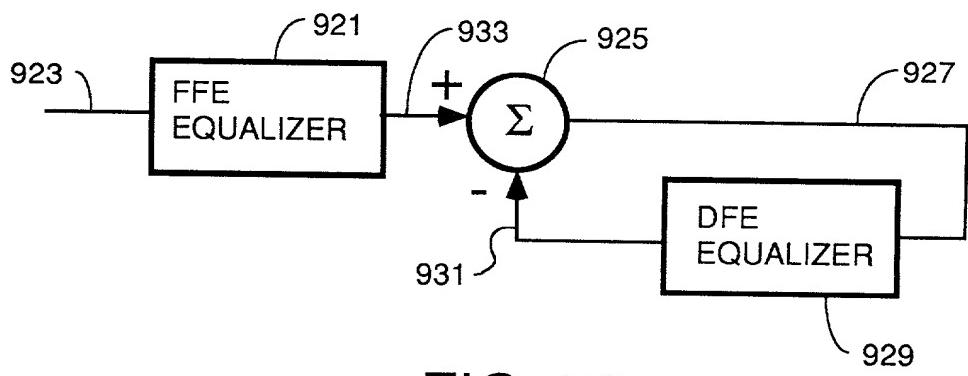


FIG. 50

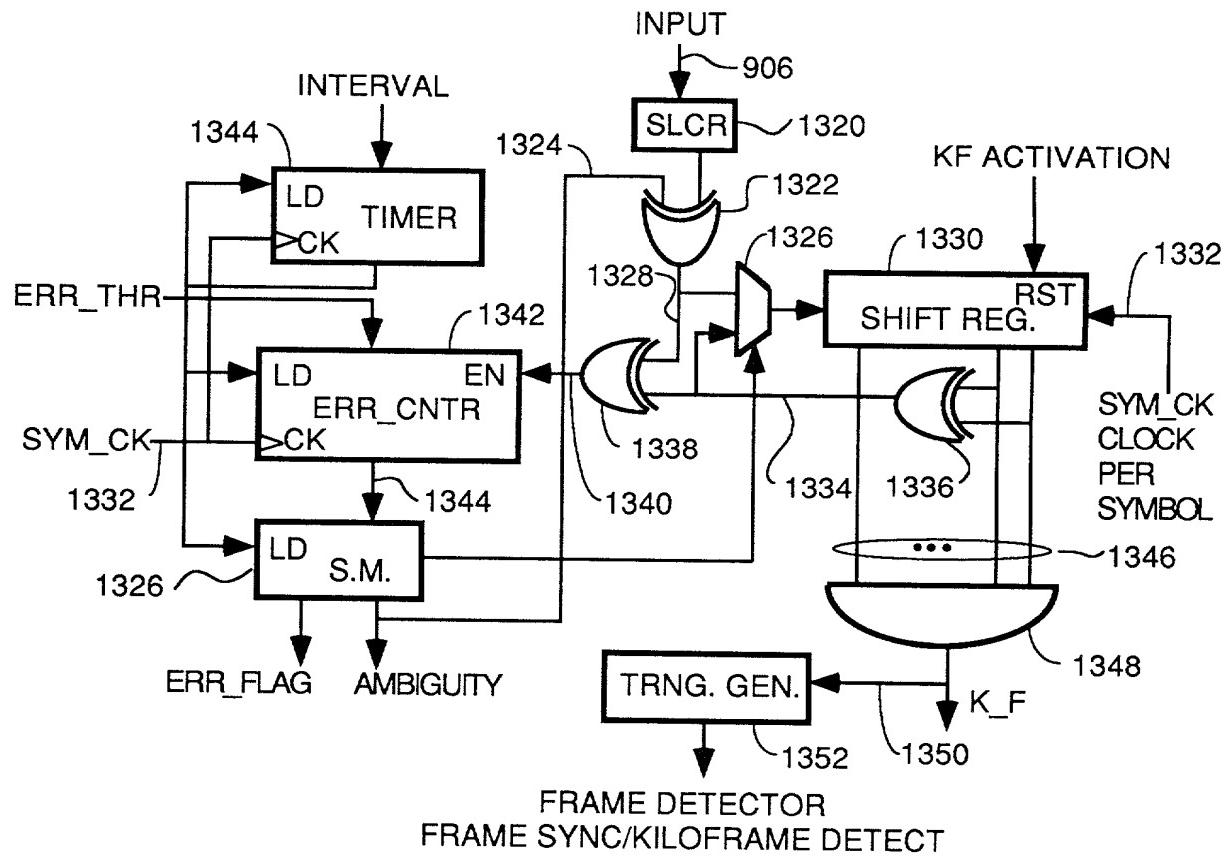
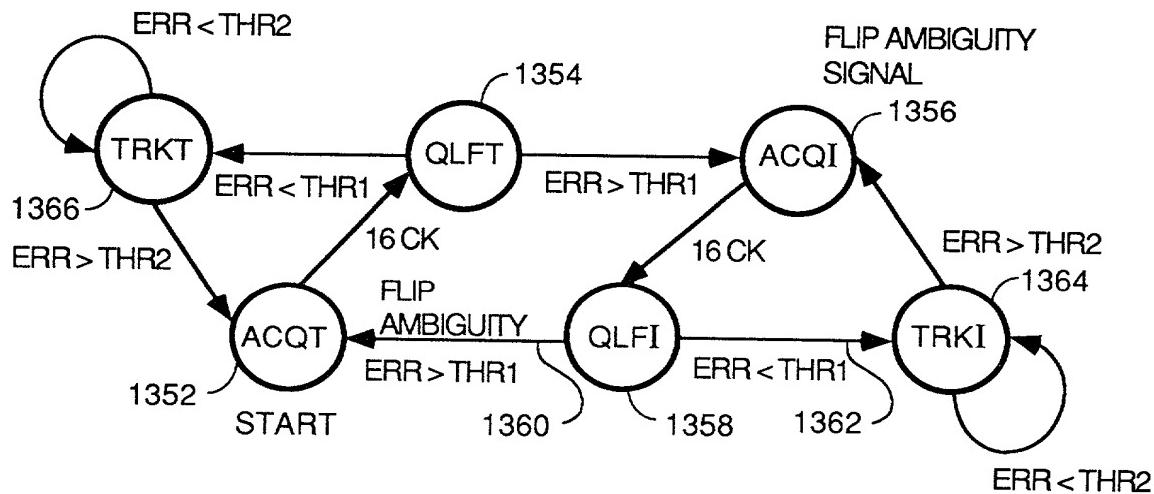


FIG. 51



STATE MACHINE

FIG. 52

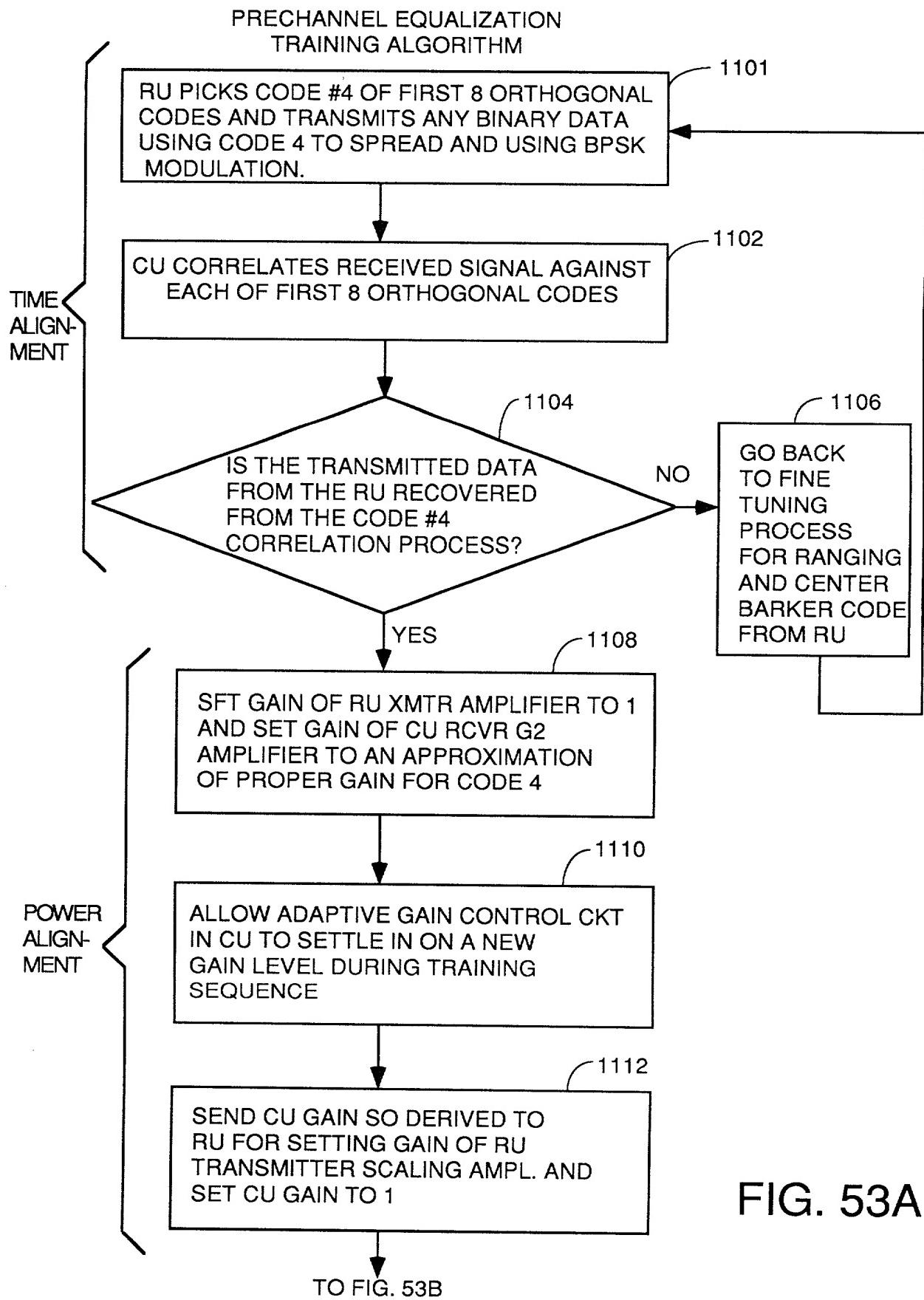


FIG. 53A

0932642250 0522101

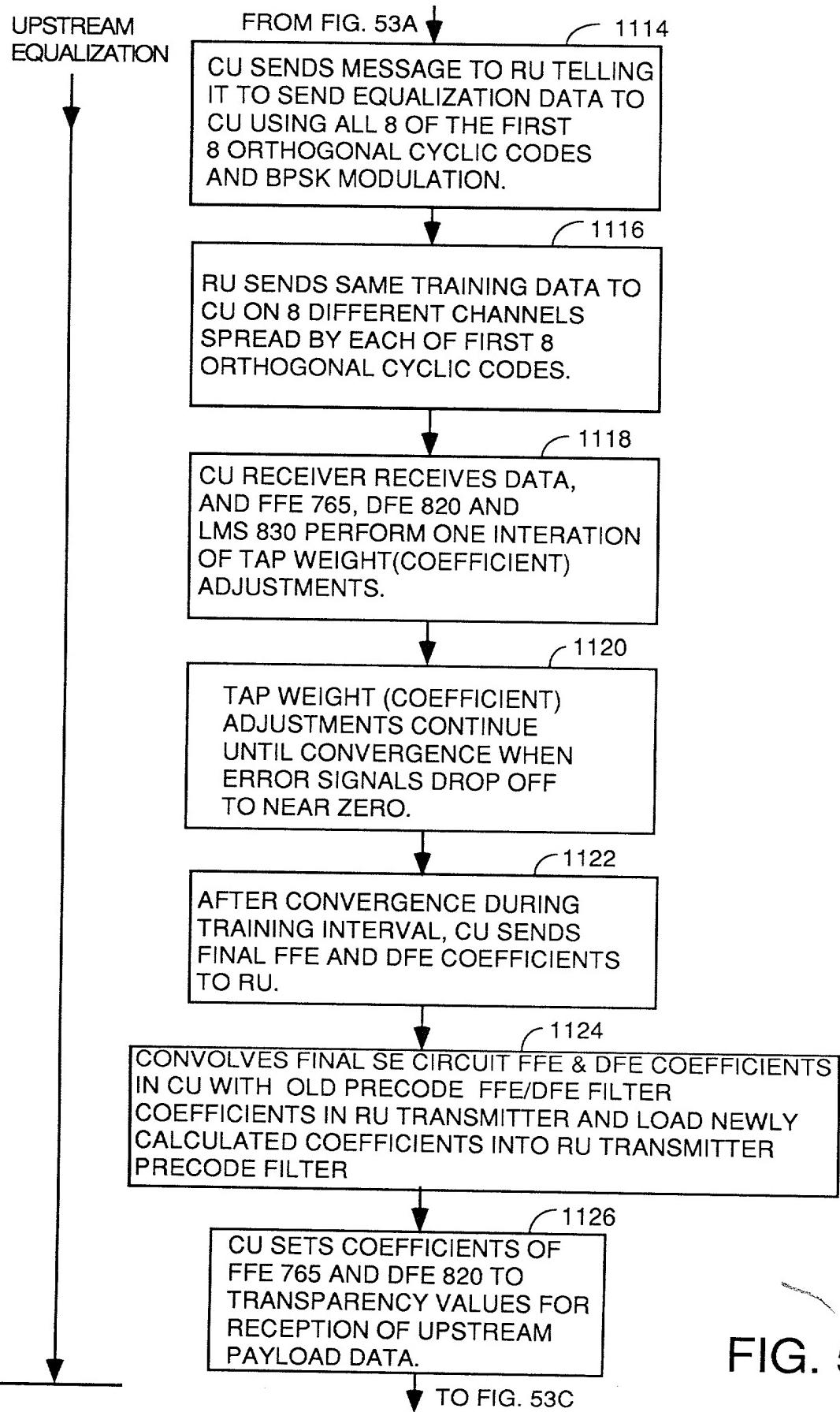


FIG. 53B

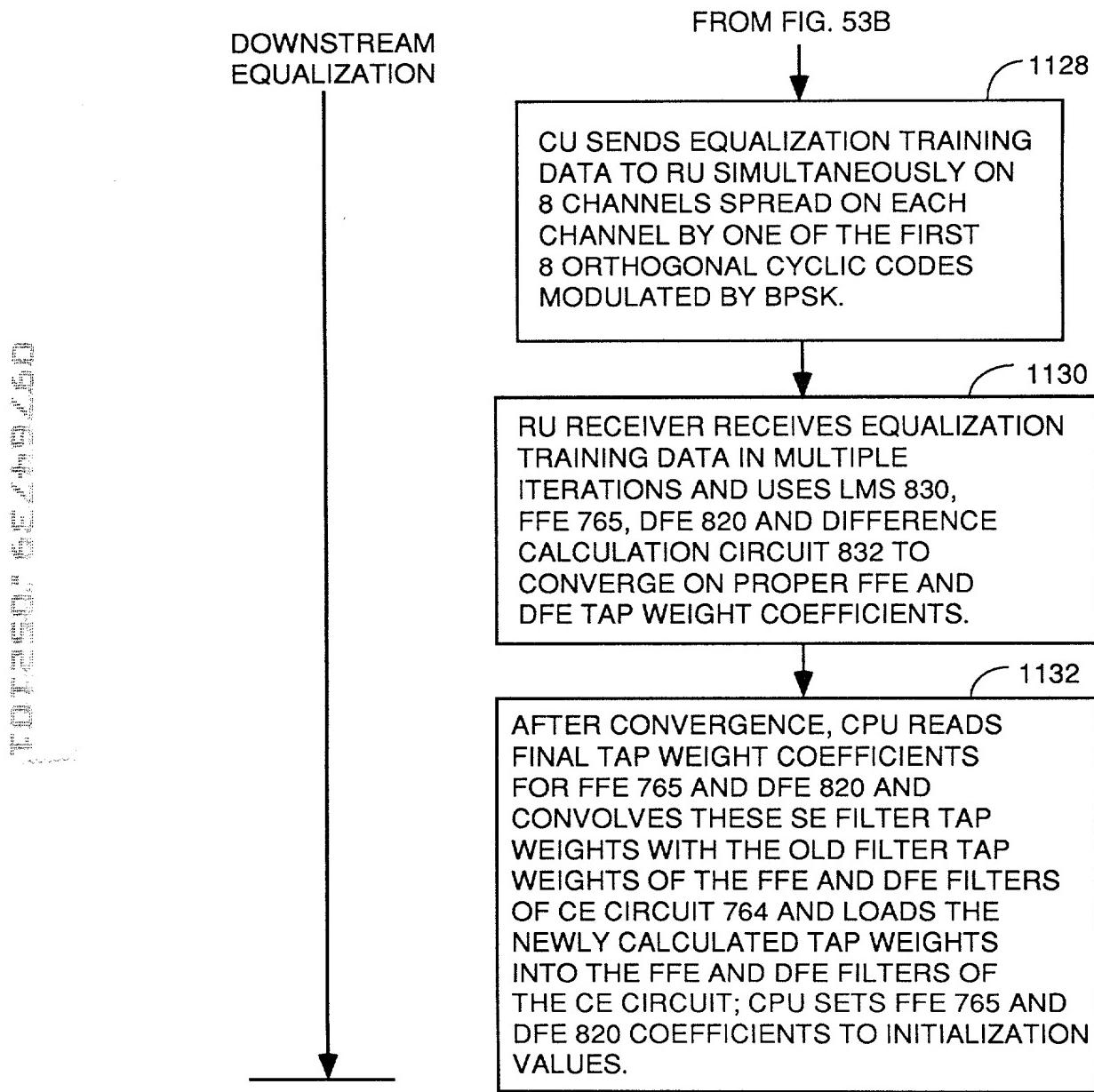


FIG. 53C

FIG. 54

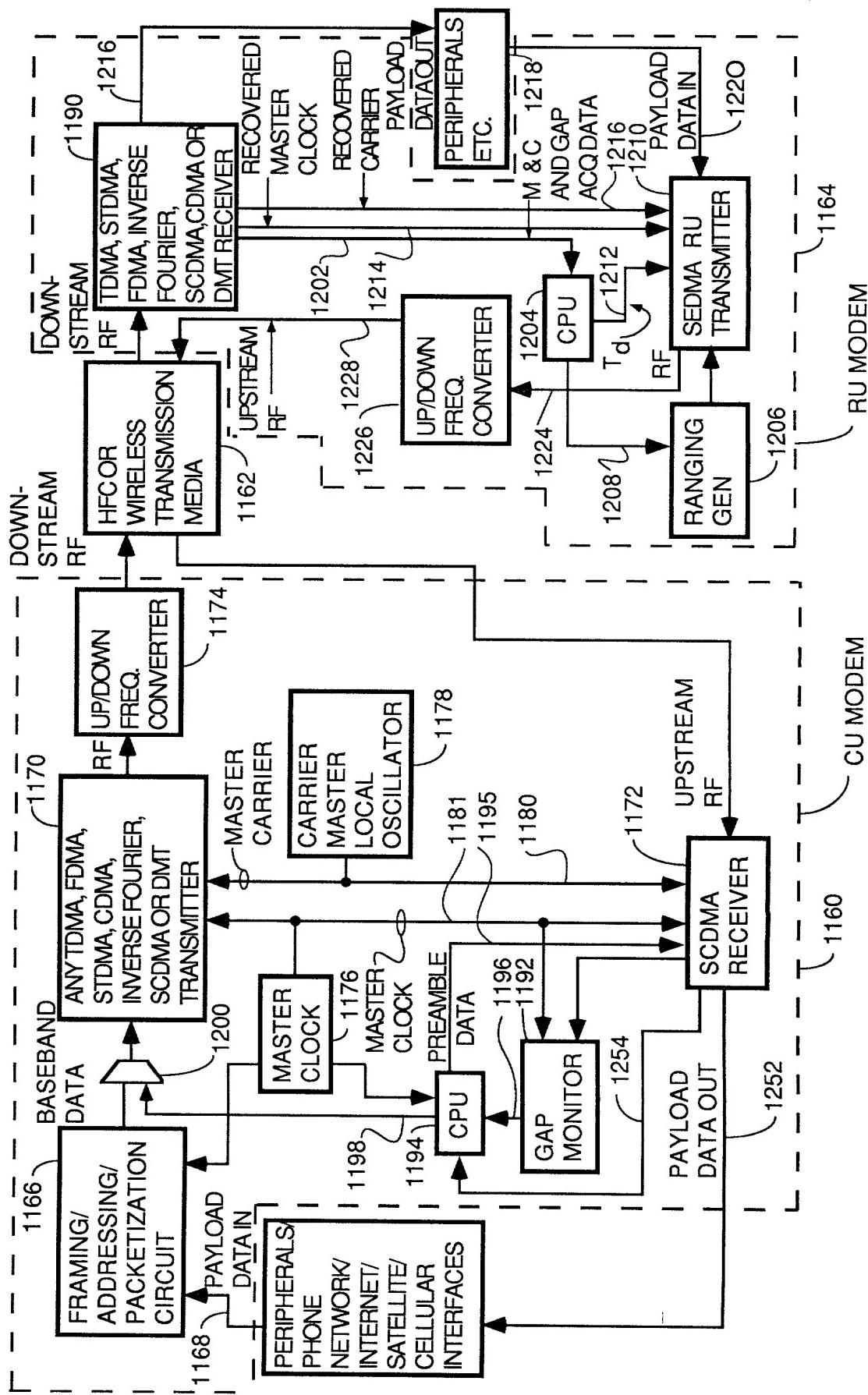


FIG. 55

SIMPLE CU SPREAD SPECTRUM RECEIVER

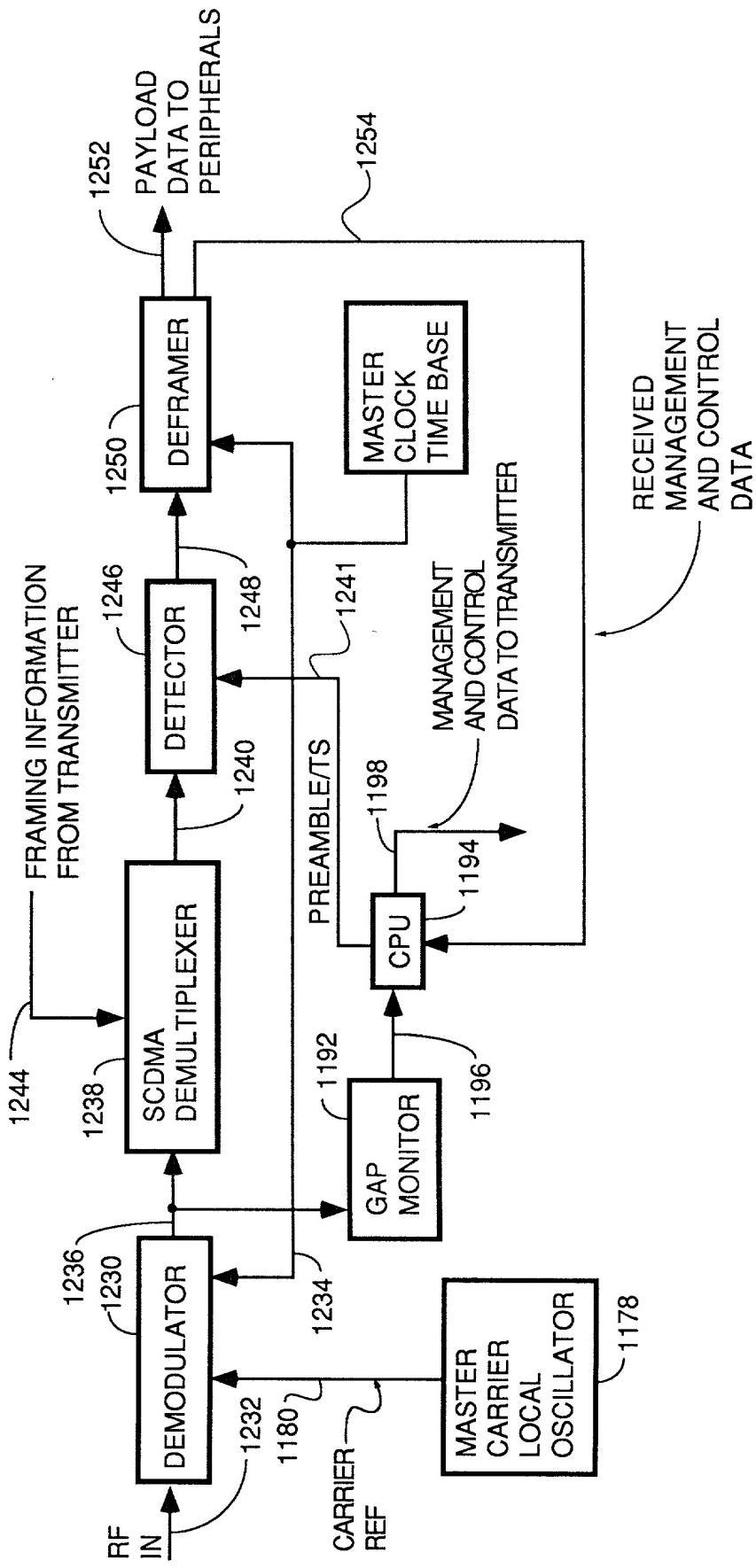
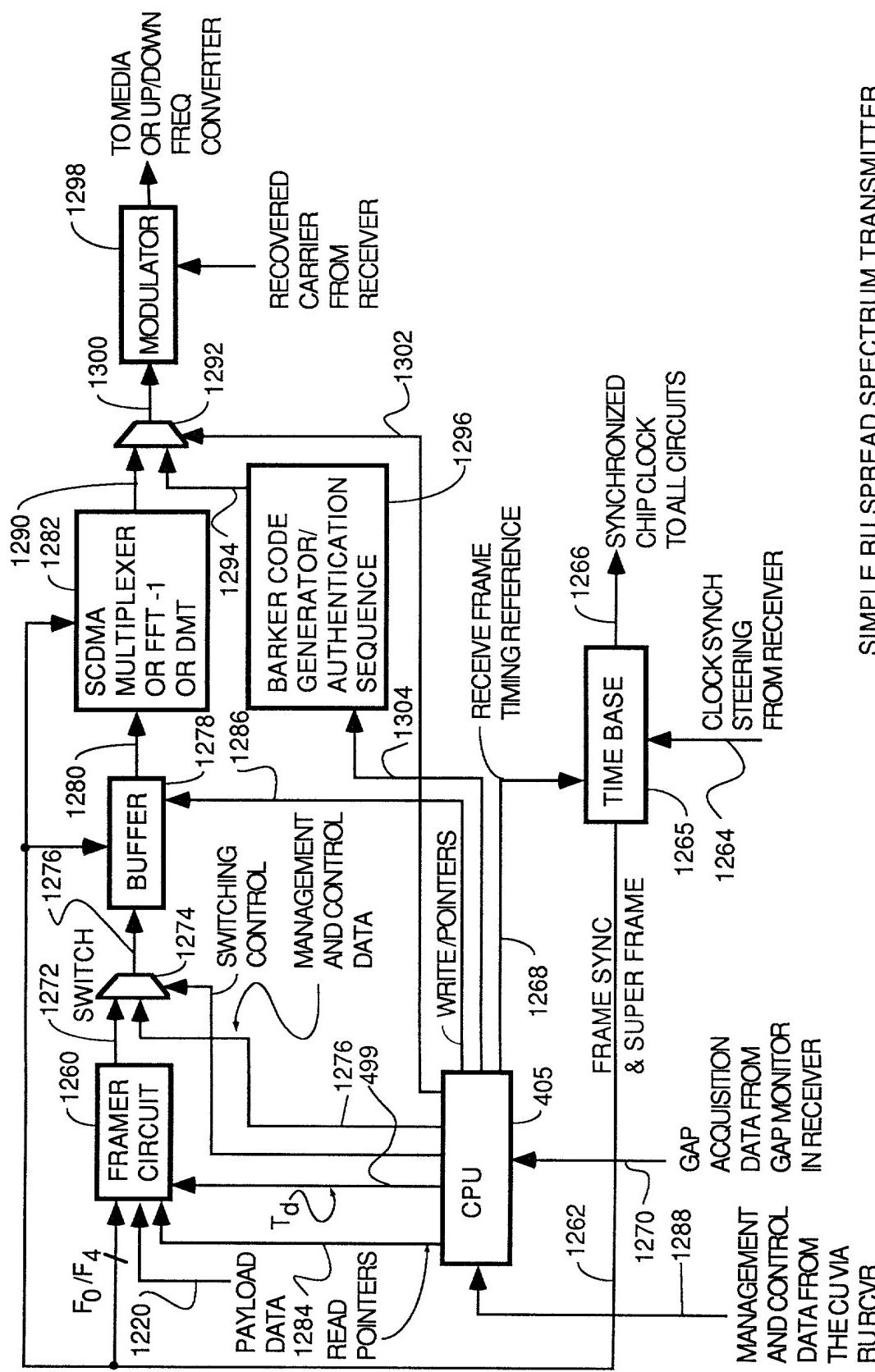


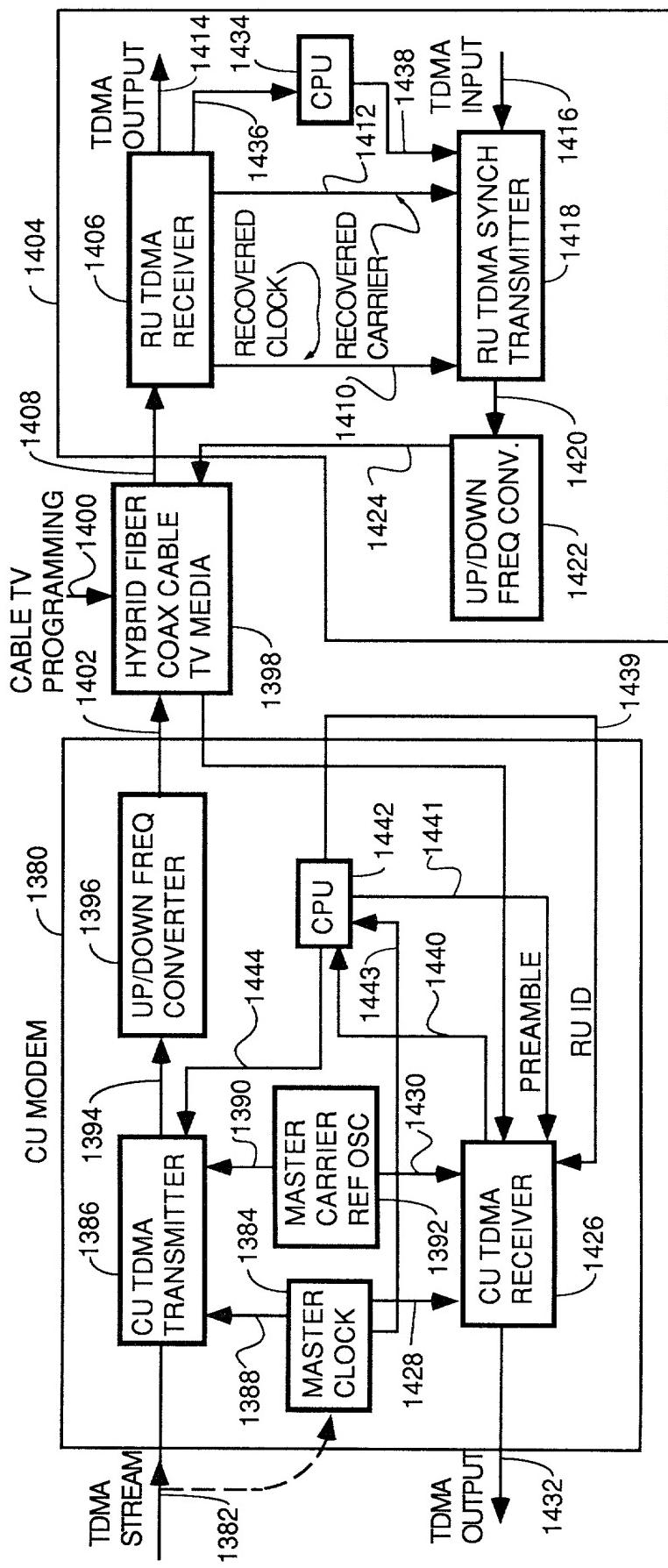
FIG. 56

SIMPLE RU SPREAD SPECTRUM TRANSMITTER



SYNCHRONOUS TDMA SYSTEM

FIG. 57



OFFSET (CHIPS)	1B ASIC		2A ASIC	
	RGSRH	RGSRL	RGSRH	RGSRL
0	0x0000	0x8000	0x0001	0x0000
1/2	0x0000	0xC000	0x0001	0x8000
1	0x0000	0x4000	0x0000	0x8000
-1	0x0001	0x0000	0x0002	0x0000

FIG. 58

TRAINING ALGORITHM

SE FUNCTION

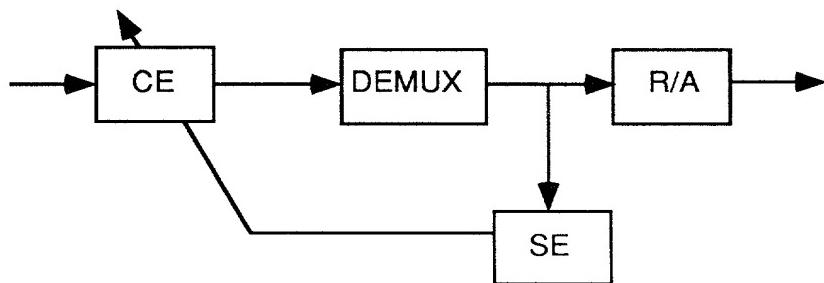
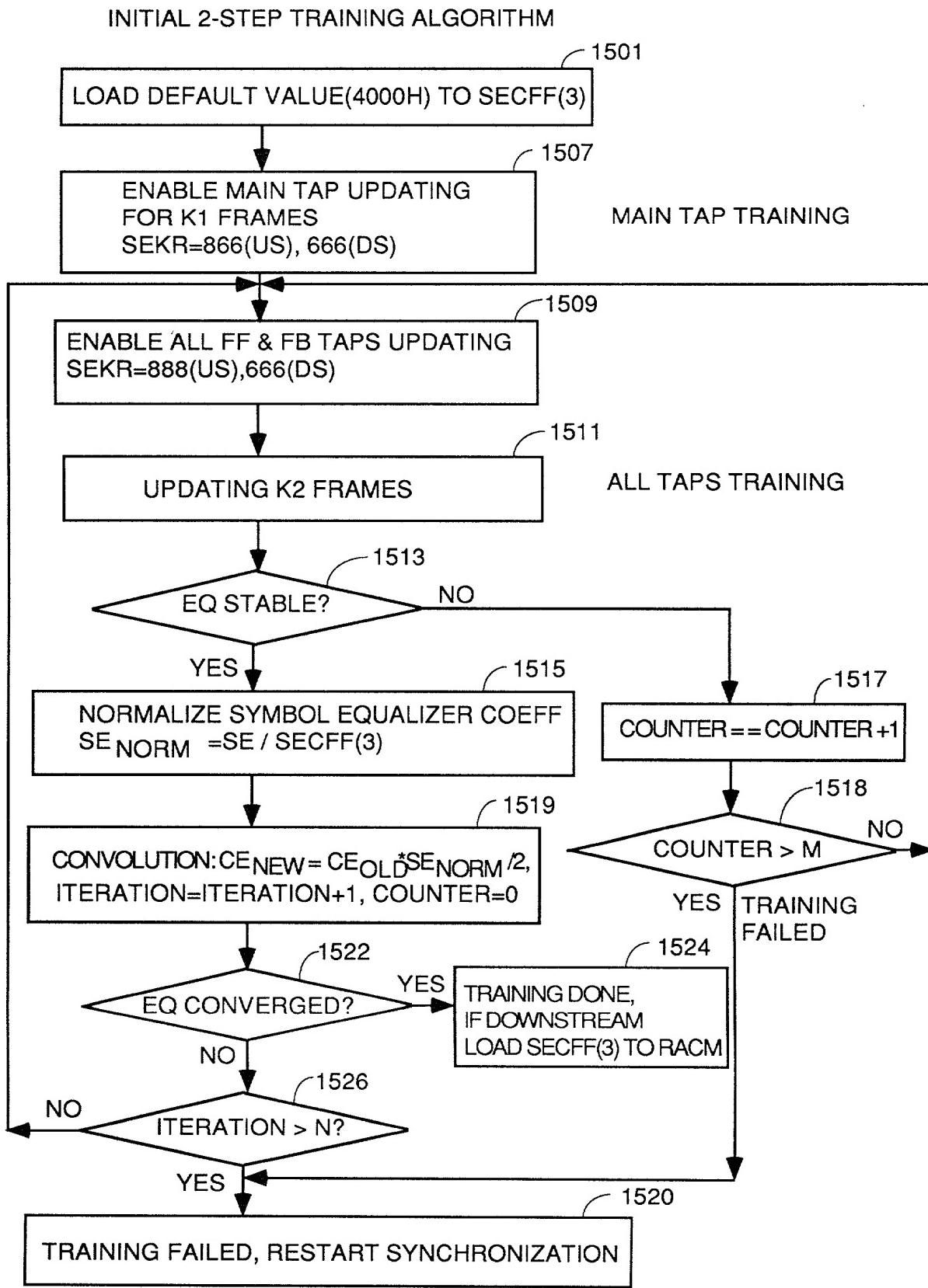


FIG. 59



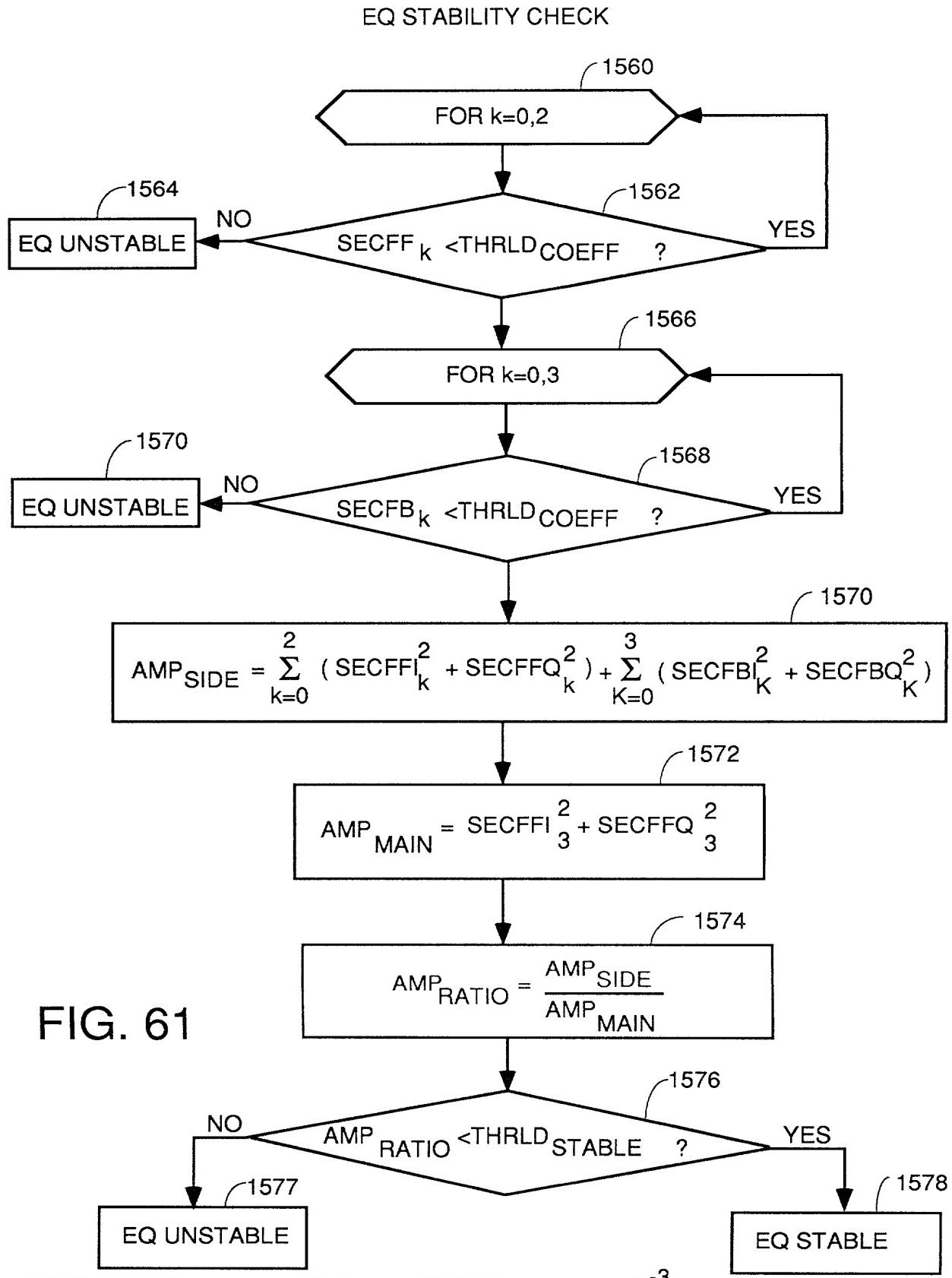


FIG. 61

NOTE: $\text{THRLD COEFF} = 7F00H$ $\text{THRLD STABLE} = 10^{-3}$

PERIODIC 2-STEP TRAINING ALGORITHM

TOP SECRET//EYES ONLY

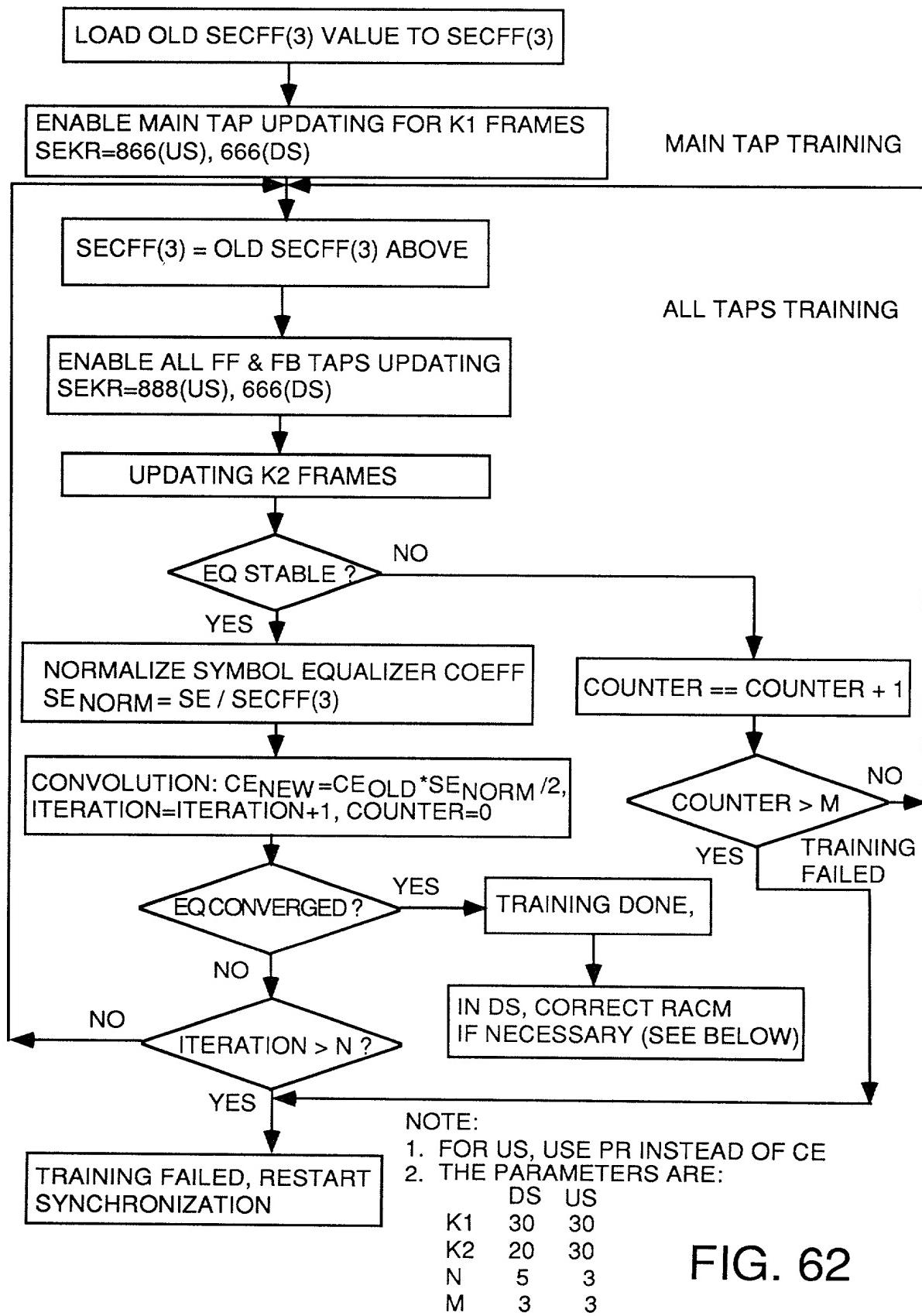
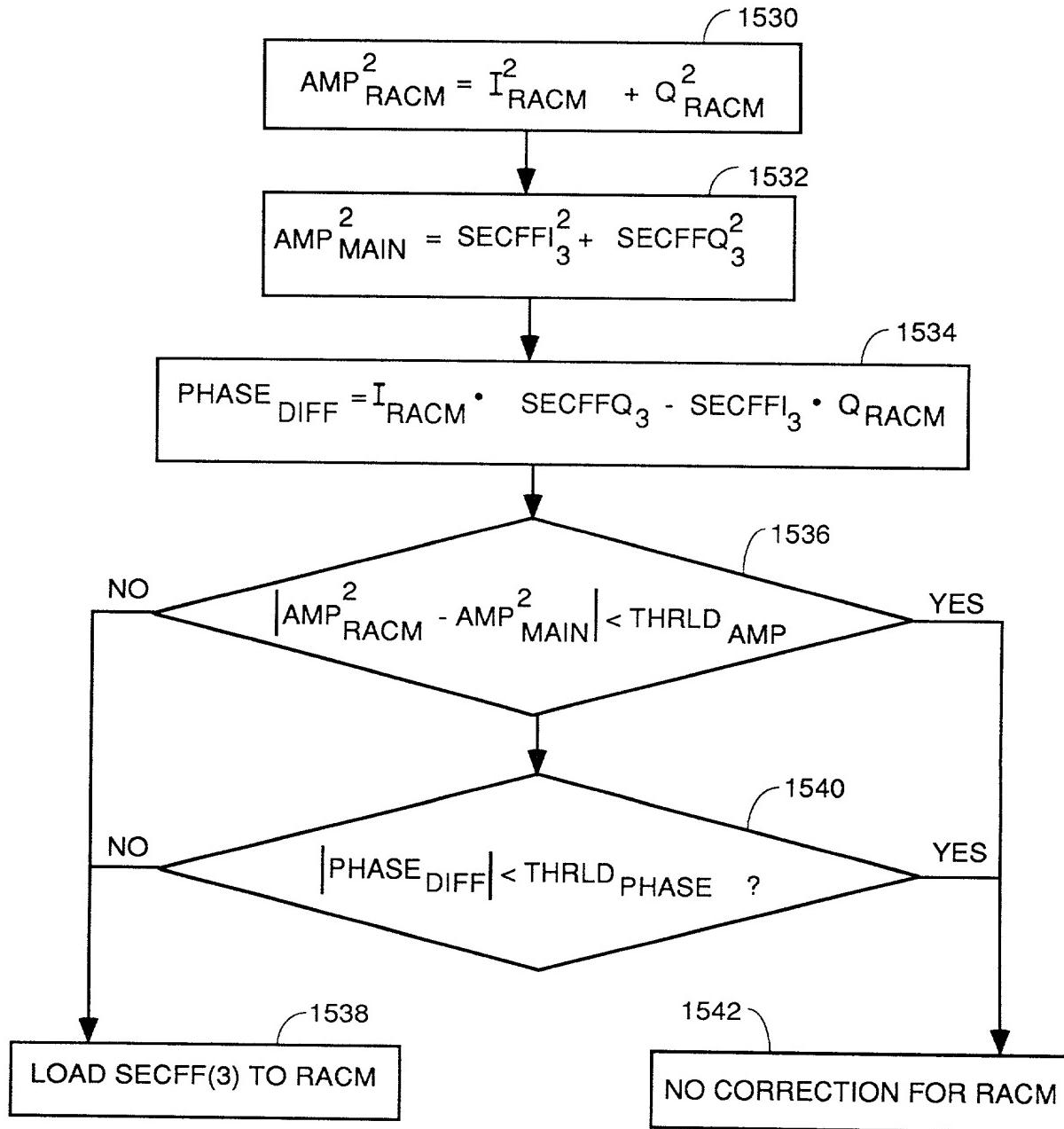


FIG. 62

RACM CORRECTION



NOTE: $\text{THRLD}_{\text{AMP}} = \text{TBD}$

$\text{THRLD}_{\text{PHASE}} = \text{TBD}$

ROTATIONAL AMPLIFIER CORRECTION

FIG. 63

EQ CONVERGENCE CHECK

1544

$$AMP_{SIDE} = \sum_{k=0}^2 (SECFFI_k^2 + SECFFQ_k^2) + \sum_{k=0}^3 (SECFB_I_k^2 + SECFB_Q_k^2)$$

1546

$$AMP_{MAIN} = SECFFI_3^2 + SECFFQ_3^2$$

1548

$$AMP_{RATIO} = \frac{AMP_{SIDE}}{AMP_{MAIN}}$$

1550

NO

YES

$$AMP_{RATIO} < THRLD_{CONVERGE} ?$$

1552

1554

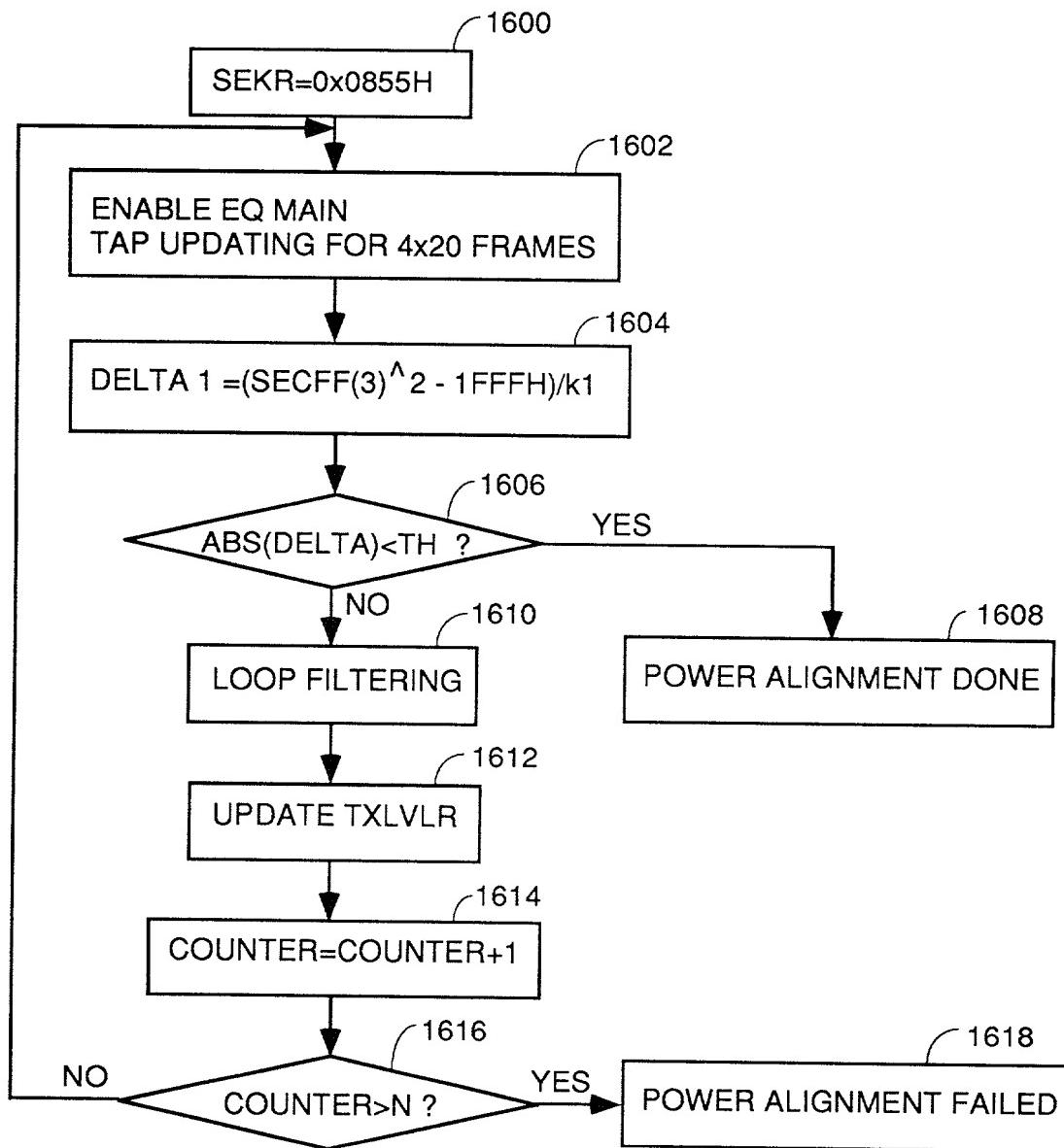
EQ NOT CONVERGED

EQ CONVERGED

NOTE: $THRLD_{CONVERGE} = 10^{-5}$

FIG. 64

POWER ALIGNMENT FLOW CHART



NOTE: TH = 600H

N = 12

FIG. 65

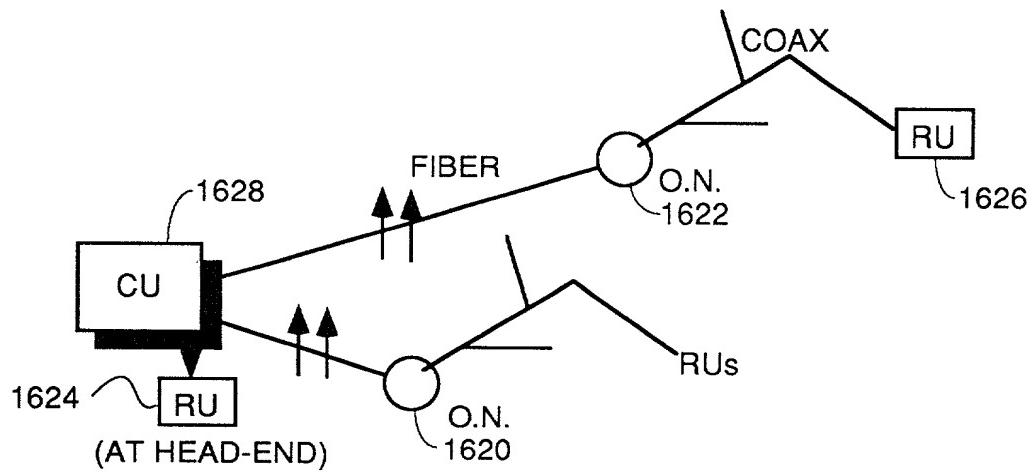
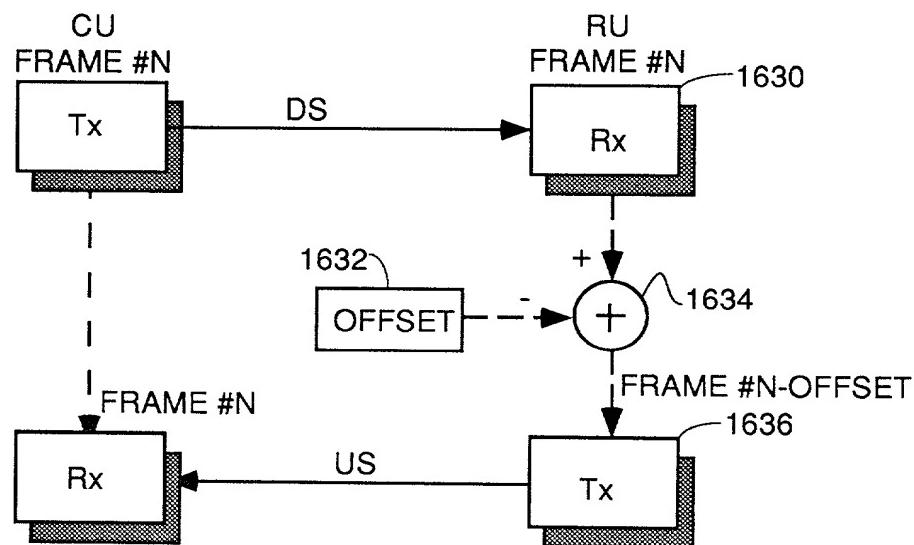


FIG. 66



TOTAL TURN AROUND (TTA) IN FRAMES = OFFSET

FIG. 67

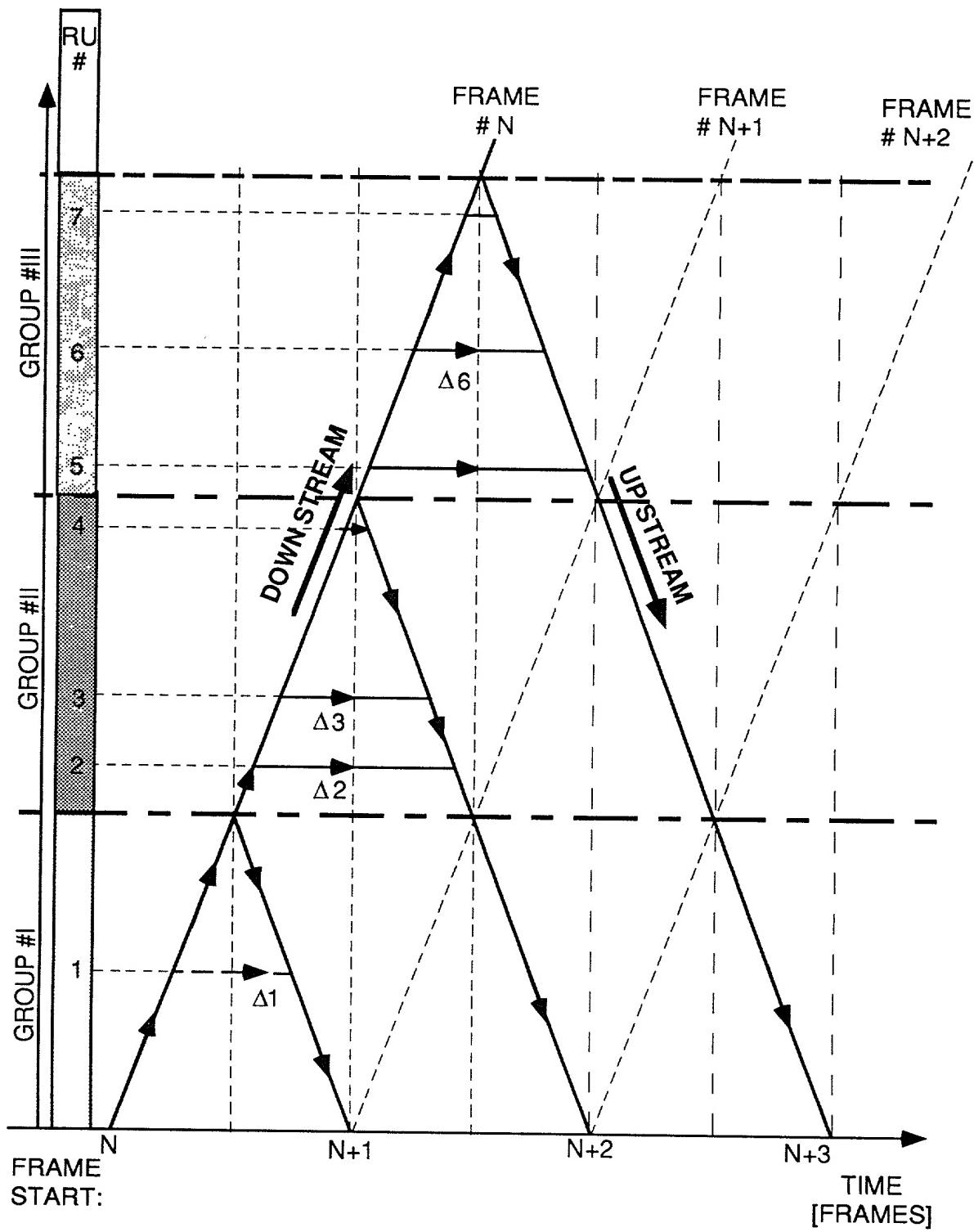
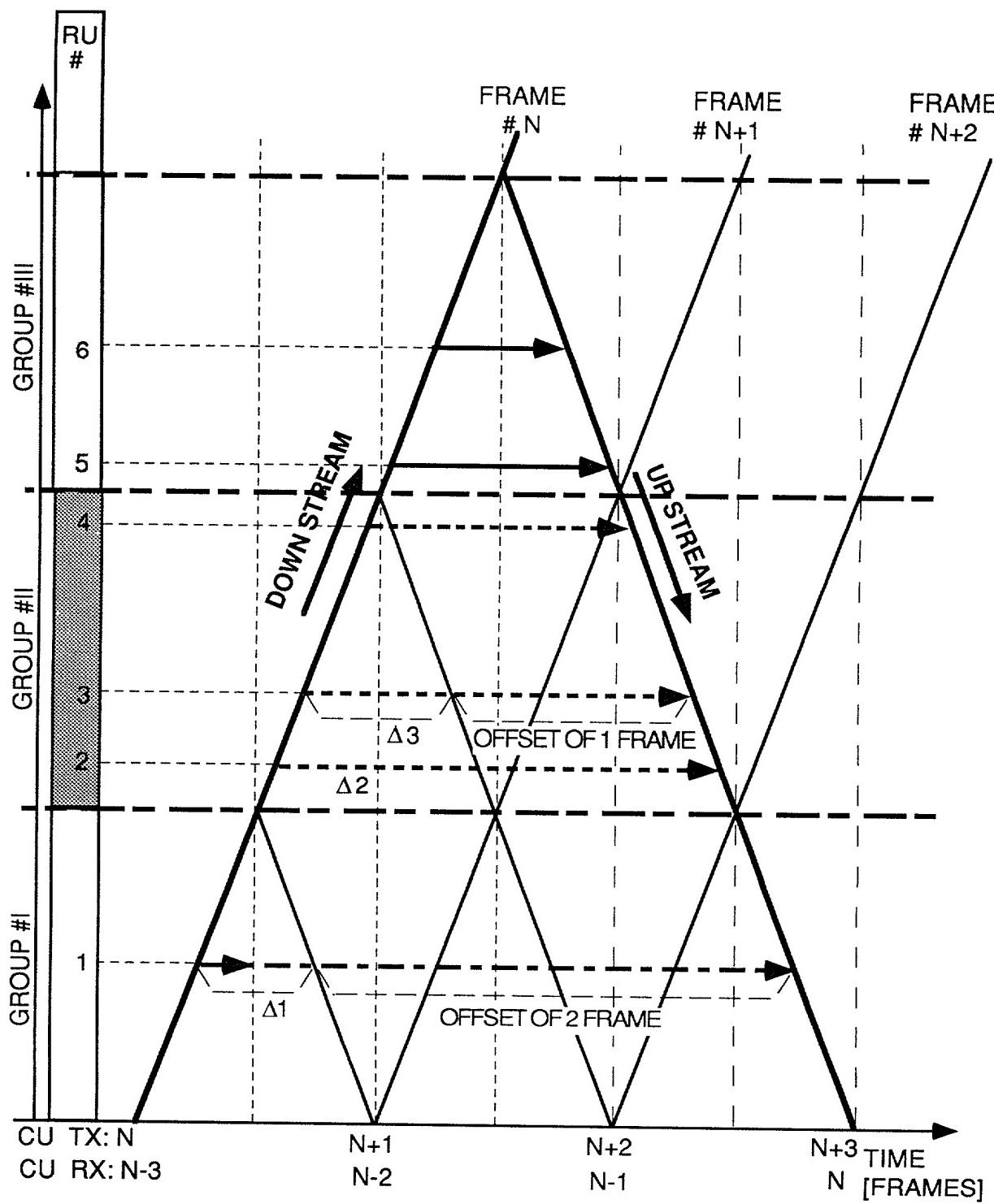


FIG. 68



CONTROL MESSAGE (DOWNSTREAM) AND FUNCTION (UPSTREAM)
PROPAGATION IN A 3 FRAMES TTA CHANNEL

FIG. 69

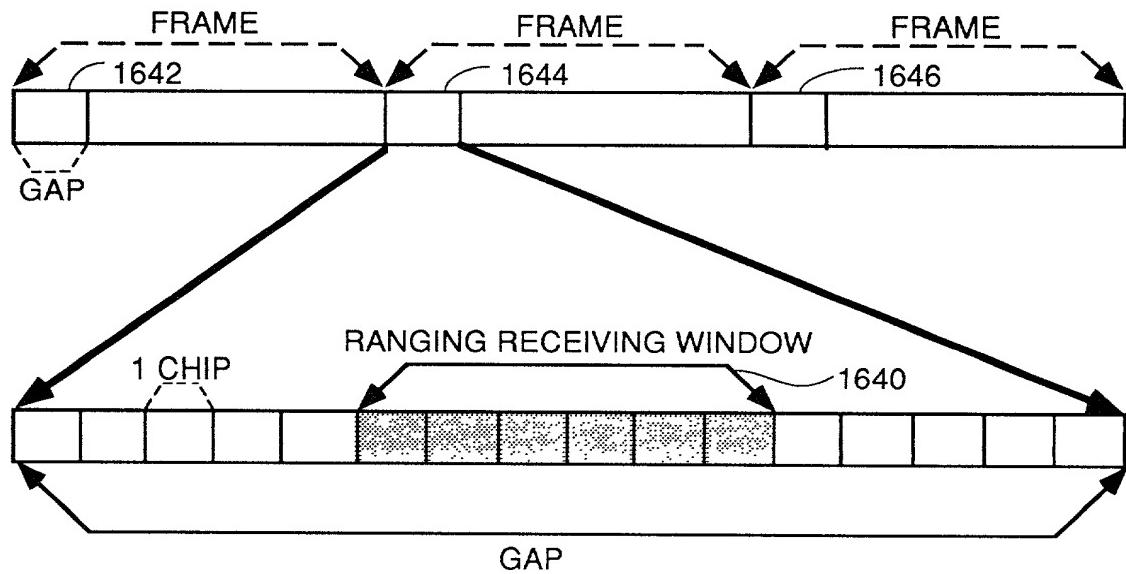
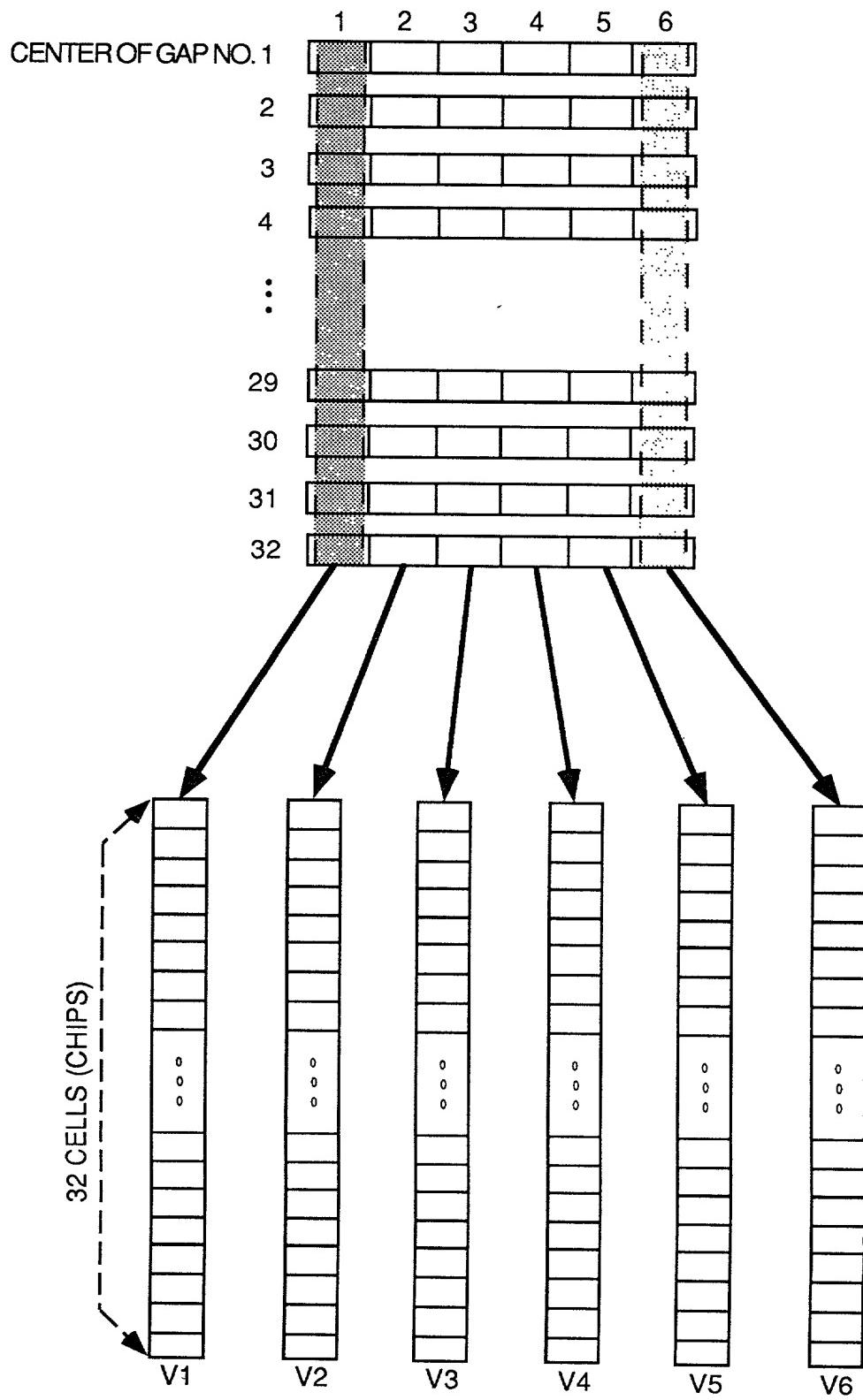


FIG. 70



OVERALL VIEW OF THE CU SENSING WINDOWS
IN A "BOUNDLESS RANGING" ALGORITHM

FIG. 71

CHIP\FR	1	2	3	4	5	6	7		33
1	0	0	1	0	0	1	1	...	0
2	1	0	0	1	1	1	1	...	
3	0	0	0	1	1	1			
4	0	0	0	1	0	0	0	...	0
5	0	1	0	0	1				
6	0	0	1	1	1				
7	0	0	0	1	1				
8	0	0	0	0	1	0	0	...	

FIG. 72